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"Wie das Gestirn,
Ohne Hast
Aber ohne Rast,
Drehe sich jeder
Um die eigene Last."

GOETHE.

TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY.

VOLUME 29.

FOR THE YEAR 1904.

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OFFICERS AND FELLOWS

OF THE

AMERICAN GYNECOLOGICAL SOCIETY,

1904.

OFFICERS FOR 1904.[1]

PRESIDENT.

EDWARD REYNOLDS, Boston.

VICE-PRESIDENTS.

J. WHITRIDGE WILLIAMS, Baltimore.
EDWARD P. DAVIS, Philadelphia.

SECRETARY.

J. RIDDLE GOFFE, New York.

TREASURER.

J. MONTGOMERY BALDY, Philadelphia.

OTHER MEMBERS OF THE COUNCIL.

MATTHEW D. MANN, Buffalo.
[To serve one year.]

ELY VAN DE WARKER, Syracuse.
[To serve three years.]

SETH C. GORDON, Portland.
[To serve two years.]

JOSEPH E. JANVRIN, New York.
[To serve four years.]

[1] Officers for the ensuing year may be found in the minutes of the meeting, page xliv

LIST OF OFFICERS

FROM THE ORGANIZATION TO THE PRESENT TIME.

* Deceased.

	President.	*Vice-Presidents.*	*Secretary.*	*Treasurer.*
1876.	*Fordyce Barker.	*Washington L. Atlee, *William H. Byford.	James R. Chadwick.	*Paul F. Mundé.
1877.	*Fordyce Barker.	*Washington L. Atlee, *William H. Byford.	James R. Chadwick.	*Paul F. Mundé.
1878.	*Edmund R. Peaslee.	*William Goodell, *Isaac E. Taylor.	James R. Chadwick.	*Paul F. Mundé.
1879.	*T. Gaillard Thomas.	*D. Humphreys Storer, *Henry P. C. Wilson.	James R. Chadwick.	*Paul F. Mundé.
1880.	*J. Marion Sims.	W. T. Howard, *Robert Battey.	James R. Chadwick.	*Paul F. Mundé.
1881.	*W. H. Byford.	T. A. Reamy, *H. F. Campbell.	James R. Chadwick.	*Paul F. Mundé.
1882.	Thomas Addis Emmet.	*George H. Lyman, *Emil Noeggerath.	James R. Chadwick.	*Paul F. Mundé.
1883.	*Gilman Kimball.	*Albert H. Smith, *Theophilus Parvin.	Frank P. Foster.	*Paul F. Mundé.
1884.	*Albert H. Smith.	James R. Chadwick, *Samuel C. Busey.	Frank P. Foster.	Matthew D. Mann.
1885.	William T. Howard.	Wm. L. Richardson, *Paul F. Mundé.	Frank P. Foster.	Matthew D. Mann.
1886.	Thaddeus A. Reamy.	*Theophilus Parvin, *Geo. J. Engelmann.	Joseph Taber Johnson.	Matthew D. Mann.
1887.	*Alex. J. C. Skene.	John C. Reeve, *Ellwood Wilson.	Joseph Taber Johnson.	Matthew D. Mann.
1888.	*Robert Battey.	*A. Reeves Jackson, James R. Chadwick.	Joseph Taber Johnson.	Matthew D. Mann.
1889.	*Henry P. C. Wilson.	*William T. Lusk, *Edward W. Jenks.	Joseph Taber Johnson.	Matthew D. Mann.
1890.	John P. Reynolds.	William M. Polk, Ely Van de Warker.	Joseph Taber Johnson.	Matthew D. Mann.
1891.	*A. Reeves Jackson.	Joseph Taber Johnson, William H. Baker.	Henry Clark Coe.	Matthew D. Mann.
1892.	*John Byrne.	Richard B. Maury, *Cornelius Kollock.	Henry Clark Coe.	Matthew D. Mann.

	President.	*Vice-Presidents.*	*Secretary.*	*Treasurer.*
1893.	*Theophilus Parvin.	William H. Parish, William H. Baker.	Henry Clark Coe.	Matthew D. Mann.
1894.	*William T. Lusk.	*Samuel C. Busey, Bache McE. Emmet.	Henry Clark Coe.	Matthew D. Mann.
1895.	Matthew D. Mann.	*Geo. J. Engelmann, Clement Cleveland.	Henry Clark Coe.	J. Montgomery Baldy.
1896.	William M. Polk.	*James H. Etheridge, Fernand Henrotin.	Henry Clark Coe.	J. Montgomery Baldy.
1897.	James R. Chadwick.	R. Stansbury Sutton, Henry J. Garrigues.	J. Riddle Goffe.	J. Montgomery Baldy.
1898.	*Paul F. Mundé.	Emilius C. Dudley, Arthur W. Johnstone.	J. Riddle Goffe.	J. Montgomery Baldy.
1899.	Joseph Taber Johnson.	Howard A. Kelly, A. F. A. King.	J. Riddle Goffe.	J. Montgomery Baldy.
1900.	*George J. Engelmann.	Edward L. Duer, Seth C. Gordon.	J. Riddle Goffe.	J. Montgomery Baldy.
1901.	Ely Van de Warker.	Charles Jewett, Richard B. Maury.	J. Riddle Goffe.	J. Montgomery Baldy.
1902.	Seth C. Gordon.	George M. Edebohls, Edward Reynolds.	J. Riddle Goffe.	J. Montgomery Baldy.
1903.	Joseph E. Janvrin.	*Edward W. Jenks, A. Palmer Dudley.	J. Riddle Goffe.	J. Montgomery Baldy.
1904.	Edward Reynolds.	J. Whitridge Williams, Edward P. Davis.	J. Riddle Goffe.	J. Montgomery Baldy.

HONORARY FELLOWS.

ELECTED

1884. GEORGE GRANVILLE BANTOCK, M.D., 14 Upper Hamilton Terrace, N. W., London, England.

1876. ROBERT BARNES, M.D., Bernersmede, Eastbourne, England.

1878. JOHN S. BILLINGS, M.D., LL.D., New York Public Library, 40 Lafayette Place, New York.

1893. CHARLES J. CULLINGWORTH, M.D., 14 Manchester Square, W., London, England.

1878. J. AMÉDÉE DOLÉRIS, M.D., Paris, France.

1902. THOMAS ADDIS EMMET, M.D., 93 Madison Ave., New York. *Founder.*

1901. HENRY J. GARRIGUES, M.D., 107 East 73d St., New York.

1899. D. BERRY HART, M.D., 29 Charlotte Square, Edinburgh, Scotland.

1902. WILLIAM T. HOWARD, M.D., 804 Madison Ave., Baltimore, Md. *Founder.*

1895. CHARLES JACOBS, M.D., 53 Boulevard de Waterloo, Brussels, Belgium.

1891. CHRISTIAN G. LEOPOLD, M.D., 25 Seminar St., Dresden, Germany.

1888. AUGUST MARTIN, M.D., Greifswald, Germany, Wallenburth, 73.

1892. OTTAVIO MORISANI, M.D., Naples, Italy.

1891. ROBERT OLSHAUSEN, M.D., N. Artillerie St., 19, Berlin, Germany.

1901. KARL PAWLIK, M.D., Spálená Ulice 3ª, Prague.

1885. W. S. PLAYFAIR, M.D., West Green Manor, Windfield Hants, England.

1891. SAMUEL POZZI, M.D., 47 Avenue d'Jena, Paris, France.

1897. JOHN C. REEVE, M.D., LL.D., Dayton, Ohio. *Founder.*

1903. WILLIAM L. RICHARDSON, M.D., 225 Commonwealth Ave., Boston. *Founder.*

1896. PAUL SÉGOND, M.D., 11 Quai d'Orsey, Paris, France.

1888. ALEXANDER R. SIMPSON, M.D., 52 Queen St., Edinburgh, Scotland.

1901. TH. TUFFIER, M.D., 42 Avenue Gabriel, Paris, France.

1881. FRANZ VON WINCKEL, M.D., Soneustrasse 16ª, Munich, Germany.

Total, twenty-three Honorary Fellows.

DECEASED.

ELECTED

1877. JOHN L. ATLEE, M.D., Lancaster, Pa.
1892. ROBERT BATTEY, M.D., Rome, Georgia. *Founder.*
1897. SAMUEL C. BUSEY, M.D. LL.D., Washington, D. C. *Founder.*
1890. HENRY F. CAMPBELL, M.D., Augusta, Georgia. *Founder.*
1889. M. CHARPENTIER, M.D., Paris, France.
1877. JOHN C. DALTON, M.D., New York.
1877. J. A. H. DEPAUL, M.D., Paris, France.
1878. J. MATTHEWS DUNCAN, M.D., London, England.
1888. ALEXANDER DUNLAP, M.D., Springfield, Ohio.
1876. JOSEPH A. EVE, M.D., Augusta, Georgia.
1889. ROBERT P. HARRIS, M.D., Philadelphia.
1888. GRAILY HEWITT, M.D., London, England.
1881. J. BRAXTON HICKS, M.D., London, England.
1876. THOMAS KEITH, M.D., London, England.
1888. GILMAN KIMBALL, M.D., Lowell, Massachusetts.
1876. ALFRED H. M'CLINTOCK, M.D., Dublin, Ireland.
1888. EMIL NOEGGERATH, M.D., Wiesbaden, Germany. *Founder.*
1877. CHARLES PAJOT, M.D., Paris, France.
1888. SIR WILLIAM O. PRIESTLEY, M.D., LL.D., London, England.
1901. M. SAENGER, M.D., Prague.
1877. F. W. VON SCANZONI, M.D., Würzburg, Bavaria.
1876. CARL SCHROEDER, M.D., Berlin, Germany.
1876. GUSTAV SIMON, M.D., Heidelberg, Germany.
1888. D. HUMPHREYS STORER, M.D., Boston. *Founder.*
1882. LAWSON TAIT, ESQ., Birmingham, England.
1881. S. TARNIER, M.D., Paris, France.
1888. ISAAC E. TAYLOR, M.D., New York. *Founder.*
1882. J. KNOWSLEY THORNTON, ESQ., London, England.
1886. SIR SPENCER WELLS, BART., London, England.
1876. MARMADUKE B. WRIGHT, M.D., Cincinnati.
1893. T. GAILLARD THOMAS, New York. *Founder*

ACTIVE FELLOWS.

* Denotes Fellows who are deceased.
† Denotes Fellows who have resigned.

1888.—Ashby, Thomas A., M.D., Professor of Diseases of Women, Baltimore Medical College; Professor of Obstetrics and Clinical Gynecology, Woman's Medical College of Baltimore; Consulting Gynecologist to Home for Incurables; Obstetrician and Gynecologist to Good Samaritan Hospital; Gynecologist to Maryland General Hospital; President of Medical and Chirurgical Society of Maryland. 1125 Madison Avenue, Baltimore.

1895.—Ashton, William Easterly, M.D. Professor of Gynecology, Medico-Chirurgical College of Philadelphia; Gynecologist to Medico-Chirurgical and Philadelphia Hospitals. 2011 Walnut Street, Philadelphia.

Founder.—*Atlee, Washington L., M.D. Made Honorary Fellow 1877.

1886.—Baer, B. F., M.D. Ex-President of Philadelphia Obstetrical Society; Professor of Gynecology, Philadelphia Polyclinic. *Council*, 1895. 1618 Summer Street, Philadelphia.

1882.—Baker, William H., M.D. Formerly Professor of Gynecology, Harvard University; Surgeon to the Free Hospital for Women. *Council*, 1887, 1890. *Vice-President*, 1891, 1893. 22 Mount Vernon Street, Boston.

1889.—Baldy, J. Montgomery, M.D. Professor of Gynecology, Philadelphia Polyclinic; Surgeon to the Gynecean Hospital; Gynecologist to the Pennsylvania Hospital. *Treasurer* 1894–1904. 1722 Chestnut Street, Philadelphia.

Founder.—*Barker, Fordyce, M.D., LL.D. 1891.

Founder.—*Battey, Robert, M.D. Made Honorary Fellow 1892.

Founder.—*Bixby, George H., M.D. 1889.

1896.—Boise, Eugene, A.B., M.D. Gynecologist to Butterworth Hospital. Grand Rapids, Michigan.

1888.—Boldt, Hermann J., M.D. Gynecologist to the German Poliklinik; Gynecologist to St. Mark's Hospital; Consulting Gynecologist to the Beth Israel Hospital; Professor of Diseases of Women, New York Post-Graduate Medical School and Hospital; Fellow of the British and International Gynecological Societies. 39 East Sixty-first Street, New York.

1897.—Bovée, J. Wesley, M.D. Gynecologist to Columbia and Providence Hospitals; Surgeon to Washington Asylum Hospital; Clinical Professor of Gynecology, Columbian University. The Rochambeau, Connecticut Avenue and H Street, Washington, D. C.

1878.—†Bozeman, Nathan, M.D. 1886.

1881.—Browne, B. Bernard, M.D. Professor of Diseases of Women and Clinical Midwifery, Woman's Medical College of Baltimore; Gynecologist to the Good Samaritan Hospital; Consulting Gynecologist to the Hospital for Consumptives. *Council*, 1886, 1893. 510 Park Avenue, Baltimore.

Founder.—*Buckingham, Charles E., M.D. 1877.

1894.—Buckmaster, Augustus H., M.D. Professor of Gynecology and Obstetrics, University of Virginia. Charlottesville, Virginia.

1898.—Burrage, Walter L., A.M., M.D. Gynecologist to St. Elizabeth's and the Carney Hospitals; Surgeon to Outpatients, Free Hospital for Women. 282 Newbury Street, Boston.

Founder.—*Busey, Samuel C., M.D., LL.D. 1901.

1889.—Byford, Henry T., M.D. Professor of Gynecology, College of Physicians and Surgeons (University of Illinois) of Chicago; Professor of Clinical Gynecology, Northwestern University Woman's Medical School; Professor of Gynecology, Chicago Post-Graduate Medical School; Professor of Gynecology, Chicago Clinical School; Surgeon to the Woman's Hospital; Gynecologist to the Chicago West Side Hospital. Reliance Building, 100 State Street, Chicago.

Founder.—*Byford, William H., M.D., LL.D. 1890.

Founder.—*Byrne, John, M.D., M.R.C.S.E. 1902.

Founder.—*Campbell, Henry F., M.D Made Honorary Fellow 1890.

Founder.—Chadwick, James R., A.M., M.D. Formerly Clinical Instructor in Gynecology, Harvard University. *Secretary*, 1876–1882. *Vice-President*, 1884, 1888. *Council*, 1892, 1894. *President*, 1897. 270 Clarendon Street, Boston.

1903.—Chipman, Walter William, M.D. Lecturer in Gynecology, McGill University; Assistant Gynecologist to Royal Victoria Hospital. 287 Mountain Street, Montreal, Canada.

1903.—Clark, John G., M.D. Professor of Gynecology, University of Pennsylvania; Gynecologist to University and St. Agnes' Hospitals; Consulting Gynecologist to Woman's and Bryn Mawr Hospitals. 218 South Fifteenth Street, Philadelphia.

1889.—Cleveland, Clement, A.M., M.D. Surgeon to the Woman's Hospital in the State of New York; Consulting Gynecologist to General Memorial Hospital. *Council*, 1894. *Vice-President*, 1895. 59 West Thirty-eighth Street, New York.

1888.—Coe, Henry C., A.M., M.D., M.R.C.S. Gynecologist to Bellevue and General Memorial Hospitals; Consulting Gynecologist to the New York Foundling Hospital; Professor of Gynecology in the University and Bellevue Hospital Medical College. *Secretary*, 1891–96. 8 West Seventy-sixth Street, New York.

1888.—*Coleman, John Scott, M.D. 1892.

1896.—Cragin, Edwin B., A.B., M.D. Professor of Obstetrics, and of Gynecology, College of Physicians and Surgeons, N. Y.; Attending Physician to the Sloane Maternity Hospital; Consulting Obstetric Surgeon to the City Maternity Hospital and the New York Infant Asylum; Consulting Gynecologist to the New York Infirmary for Women and Children. 10 West Fiftieth Street, New York.

1904.—Cullen, Thomas S., M.B. Associate Professor of Gynecology, Johns Hopkins University; Associate Gynecologist, Johns Hopkins Hospital; Consulting Gynecologist Church Home and Infirmary. 3 West Preston Street, Baltimore, Maryland.

1889.—Currier, Andrew F., A.B., M.D. Assistant Gynecologist to the Skin and Cancer Hospital; Attending Gynecologist to Bellevue Hospital, Out-patient Department; Consulting Gynecologist to McDonough Memorial Hospital, New York

and Ossining Hospital, Sing Sing, N. Y., and Mt. Vernon Hospital, Mt. Vernon, N. Y. 173 East Lincoln Avenue, Mount Vernon, New York.

1893.—Cushing, Ernest W., A.B., M.D. Surgeon to Woman's Charity Club Hospital. 168 Newbury Street, Boston.

1889.—Davenport, Francis H., A.B., M.D. Assistant Professor of Gynecology, Harvard University; Assistant Surgeon to the Free Hospital for Women; Physician to the Department of Diseases of Women, Boston Dispensary. *Council*, 1891. 419 Boylston Street, Boston.

1891.—Davis, Edward P., A.M., M.D. Professor of Obstetrics, Jefferson Medical College; Professor of Obstetrics and Diseases of Infancy, Philadelphia Polyclinic; Visiting Obstetrician to the Jefferson, Philadelphia, and Polyclinic Hospitals; Clinical Professor of Pediatrics, Woman's Medical College. *Council*, 1896, 1899. 250 South Twenty-first Street, Philadelphia.

1892.—Dickinson, Robert L., M.D. Surgeon (Gynecologist) to Brooklyn Hospital; Obstetrician to Kings County Hospital; Instructor in Obstetrics and Assistant Obstetrician, Long Island College Hospital. 168 Clinton Street, Brooklyn, N. Y.

Founder.—*Drysdale, Thomas M., A.M., M.D. 1904.

1889.—Dudley, A. Palmer, M.D. Professor of Diseases of Women, New York Post-Graduate Medical School and Hospital; Gynecologist to Harlem Hospital. *Council*, 1893. *Vice-President*, 1903. 678 Madison Avenue, New York.

1886.—Dudley, Emilius Clark, A.B., M.D. Professor of Gynecology, Chicago Medical College; Fellow of the British Gynecological Society. *Council*, 1891, 1893. *Vice-President*, 1898. 1619 Indiana Avenue, Chicago.

1879.—Duer, Edward L., A.M., M.D. Gynecologist to the Presbyterian Hospital; Visiting Obstetrician to Preston Retreat; Consulting Obstetrician to Philadelphia Maternity, etc. *Vice-President*, 1899. 1606 Locust Street, Philadelphia.

1891.—Edebohls, George M., A.M., M.D. Professor of Diseases of Women, New York Post-Graduate Medical School and Hospital; Gynecologist to St. Francis' Hospital. *Council*, 1896. 59 West Forty-ninth Street, New York.

1893.—Edgar, James Clifton, Ph.B., A.M., M.D. Professor of Obstetrics, Cornell University Medical College of New York; Obstetric Surgeon to the Mothers' and Babies' Hospital; Obstetrician to the Emergency Lying-in Hospital. 50 East Thirty-fourth Street, New York.

1887.—Emmet, Bache McE., M.D. Professor of Gynecology, New York Post-Graduate Medical School and Hospital; Surgeon to the Woman's Hospital in the State of New York. *Vice-President*, 1894. 18 East Thirtieth Street, New York.

1895.—Emmet, John Duncan, M.D. Gynecologist to St. Vincent's Hospital. 91 Madison Avenue, New York.

Founder.—Emmet, Thomas Addis, M.D., LL.D. Made Honorary Fellow 1902.

Founder.—*Engelmann, George J., A.M., M.D. 1903.

1890.—*Etheridge, James H., A.M., M.D. 1899.

1904. Findley, Palmer, B.S., M.D. Instructor in Obstetrics and Gynecology, Rush Medical College; Assistant Gynecologist, Presbyterian Hospital. 100 State Street, Chicago.

1889.—Ford, Willis E., A.M., M.D. Medical Director, St. Luke's Hospital; Professor of Electro-Therapeutics, University of Buffalo; Lecturer on Electro-Therapeutics, New York University and Bellevue Medical School. *Council*, 1893. 266 Genesee Street, Utica, N. Y.

1881.—†Foster, Frank P., M.D. 1895.

1902.—Frederick, Carlton C., B.S., M.D. Professor of Clinical Gynecology, University of Buffalo; Surgeon-in-Chief Buffalo Woman's Hospital. 64 Richmond Ave., Buffalo, N. Y.

1890.—Fry, Henry D., M.D. Professor of Obstetrics, Medical Department of Georgetown University. 1133 Fourteenth Street, N. W., Washington, D. C.

1904.—Gellhorn, George, M.D. Gynecologist to St. Luke's Hospital; Consulting Gynecologist to City Insane Asylum. 32 Linmar Building, St. Louis, Missouri.

1888.—Gehrung, Eugene C., M.D. President and Chief of the Gynecological Department of the South Side Dispensary; Consulting Gynecologist of the Missouri Baptist Sanitarium; Corresponding Member of Société Obstétricale et Gynécologique de Paris; Membre Titulaire de la Société Française d'Electrothérapie. N. E. corner Vandeventer Avenue and Westminster Place, St. Louis.

1881.—†Gillette, Walter R., M.D. 1889.

1891.—Goffe, J. Riddle, Ph.M., M.D. Professor of Gynecology, New York Polyclinic Medical School and Hospital; Gynecologist to New York City Hospital; Assistant Gynecologist to the New York Skin and Cancer Hospital; Consulting Gynecologist to St. Joseph's Hospital, Yonkers, N. Y., and to Mt. Vernon Hospital, Mt. Vernon, N. Y. *Council*, 1896. *Secretary*, 1897–1904. 29 West Forty-sixth Street, New York.

Founder.—*Goodell, William, A.M., M.D., LL.D. 1895.

1877.—†Goodman, John, M.D. 1892.

1888.—Gordon, Seth C., M.D. Lecturer on Diseases of Women, Portland School of Medical Instruction; Surgeon to the Maine General Hospital; Consulting Surgeon to the Maine Eye and Ear Infirmary; President of the Maine Academy of Medicine and Science; Ex-President of the Maine Medical Association; Ex-President of the Section of Obstetrics and Gynecology of the American Medical Association; Fellow of the British Gynecological Society. *Council*, 1892. *President*, 1902. Portland, Maine.

1890.—Grandin, Egbert H., M.D. Consulting Gynecologist to the French Hospital; Attending Gynecologist to Columbus Hospital. 116 West Seventy-sixth Street, New York.

1886.—Green, Charles M., A.B., M.D. Professor of Obstetrics and Clinical Gynecology, Harvard University; Obstetric Physician to the Boston Dispensary; Senior Visiting Physician for Diseases of Women, Boston City Hospital; Assistant Visiting Physician to the Boston Lying-in Hospital. *Council*, 1895, 1899. 78 Marlborough Street, Boston.

1887.—*Hanks, Horace Tracy, M.D., LL.D. 1900.

1895.—Harris, Philander A., M.D. Gynecologist to the Paterson General Hospital and to Passaic General Hospital; Corresponding Member of the Obstetrical and Gynecological Society of Paris, France (1885). 26 Church Street, Paterson, N. J.

1894.—Harrison, George T., A.M., M.D. 63 West Fifty-first Street, New York.

1894.—Henrotin, Fernand, M.D. Professor of Gynecology, Chicago Polyclinic; Senior Surgeon to the Alexian Brothers' Hospital; Ex-President of the Chicago Gynecological Society; Consulting Gynecologist to St. Joseph's Hospital; Corresponding Member of the Belgian Gynecological Society. 353 La Salle Avenue, Chicago.

1891.—Hirst, Barton Cooke, M.D. Professor of Obstetrics, University of Pennsylvania; Obstetrician to the University and Maternity Hospitals; Visiting Obstetrician to the Preston Retreat; Gynecologist to the Howard Hospital and to the Southeastern Hospital for Women and Children; Consulting Obstetrician to the Lying-in Charity. 1821 Spruce Street, Philadelphia.

1892.—*Holmes, Horatio R., M.D. 1896.

Founder.—Howard, William T., M.D. Made Honorary Fellow 1902.

1885.—*Hunter, James B., M.D. 1889.

1891.—Ingalls, Phineas H., A.M., M.D. Gynecologist to the Hartford Hospital. 112 High Street, Hartford, Conn.

Founder.—†Ingham, James V., M.D. 1889.

1877.—*Jackson, A. Reeves, A.M., M.D. 1892.

1889.—*Jaggard, W. W., M.D. 1896.

1886.—Janvrin, Joseph E., M.D. President of the New York Obstetrical Society (1889 1891); Gynecologist to the Skin and Cancer Hospital; Consulting Surgeon to St. Elizabeth's Hospital. *Council.* 1889. 1892. *President.* 1903. 191 Madison Avenue, New York.

1895.—Jarman, George W., A.M., M.D. Gynecologist to the General Memorial Hospital; Obstetric Surgeon to the New York Maternity Hospital; Instructor in Gynecology, College of Physicians and Surgeons; Chief of Clinic, Department of Diseases of Women, Vanderbilt Clinic. 54 West Seventy-sixth Street, New York.

Founder.—*Jenks, Edward W., M.D., LL.D. 1903.

1885.—Jewett, Charles, A.M., M.D. Professor of Gynecology and Obstetrics, Long Island College Hospital, Brooklyn; Attending Physician to Long Island College Hospital; Physician-in-Chief to Department of Children's Diseases, St. Mary's Hospital, Brooklyn; Consulting Obstetrician to Kings County Hospital; Fellow of the British Gynecological Society. *Council.* 1895. 1897. 330 Clinton Avenue, Brooklyn.

Founder.—Johnson, Joseph Taber, A.M., Ph.D., M.D. Professor of Gynecology, University of Georgetown; Gynecologist to the Providence Hospital; President of the Woman's Dispensary; President of the Medical Society of the District of Columbia (1887); Member of the British Medical Association; Fellow of the British Gynecological Society; President of the

Washington Obstetrical and Gynecological Society. *Secretary*, 1886–90. *Vice-President*, 1891. *Council*, 1881, 1885, 1897. *President*, 1899. 926 Farragut Square, Washington, D. C.

1886.—Johnstone, Arthur W., A.M., M.D. Professor of Gynecology, Woman's Medical College; Fellow of the British Gynecological Society. *Vice-President*, 1898. *Council*, 1894. 1897. Madisonville Road, Cincinnati.

1892.—*Keating, John M., M.D., LL.D. 1893.

1887.—Kelly, Howard A., M.D. Professor of Gynecology and Obstetrics in Johns Hopkins University; Gynecologist and Obstetrician to the Johns Hopkins Hospital; Consulting Surgeon to the Kensington Hospital for Women, Philadelphia. *Vice-President*, 1899. 1418 Eutaw Place, Baltimore, Md.

1886.—King, Albert F. A., A.M., M.D. Professor of Obstetrics and Diseases of Women and Children in the Medical Department of the Columbian University, Washington, and in the University of Vermont; President of the Washington Obstetrical and Gynecological Society (1885–87); Fellow of the British Gynecological Society; Consulting Physician to the Children's Hospital, Washington; Consulting Physician to the Woman's Dispensary. *Council*, 1898. *Vice-President*, 1899. 1315 Massachusetts Avenue, N. W., Washington, D. C.

1892.—Kirkley, Cyrus A., M.D. Toledo, Ohio.

1888.—*Kollock, Cornelius, A.M., M.D. 1897.

1891.—Krug, Florian, M.D. Gynecologist to the German Hospital. 13 East Forty-first Street, New York.

1881.—*Lee, Charles Carroll, A.M., M.D., LL.D. 1893.

Founder.—*Lusk, William T., A.M., M.D., LL.D. 1897.

Founder.—*Lyman, George H., M.D. 1891.

1892.—McLean, Malcolm, M.D. Surgeon to St. Andrew's Infirmary for Women; Consulting Gynecologist to the Randall's Island Hospitals. 31 East One Hundred and Twenty-sixth Street, New York.

1891.—†MacLaren, Archibald, B.S., M.D. 1903.

1892.—MacMonagle, Beverly, M.D. Crocker Building, San Francisco, Cal.

1882.—Mann, Matthew D., A.M., M.D. Professor of Obstetrics and Gynecology, University of Buffalo; Gynecologist and Consulting Obstetrician to the Buffalo General Hospital. *Treasurer*, 1884–95. *President*, 1895. 37 Allen Street, Buffalo, N. Y.

1901.—Manton, Walter Porter, M.D. Clinical Professor of Gynecology and Adjunct Professor of Obstetrics, Detroit College of Medicine; Gynecologist to Harper Hospital and to the Eastern and Northern Michigan Asylums for the Insane; Consulting Gynecologist to St. Joseph's Retreat; Visiting Obstetrician and Vice-President of Medical Board, Woman's Hospital and Infants' Home; Member of the Committee for the Examination of Midwives, Detroit Board of Health; Fellow of the Southern Surgical and Gynecological Association; American Association of Obstetricians and Gynecologists, and the British Gynecological Society. 32 Adams Avenue, Detroit, Mich.

1883.—Maury, Richard B., M.D. *Council*, 1886, 1888. *Vice-President*, 1892. 111 Court Street, Memphis, Tenn.

1894.—Montgomery, Edward E., A.M., M.D. Professor of Clinical Gynecology, Jefferson Medical College; Gynecologist to Jefferson Medical College and to St. Joseph's Hospital; Obstetrician to the Philadelphia Hospital. 1703 Walnut Street, Philadelphia.

1891.—Moseley, William E., M.D. Professor of Diseases of Women, Baltimore Medical College; Gynecologist to the Maryland General Hospital. *Council*, 1897. 614 North Howard Street, Baltimore, Md.

Founder.—*Munde, Paul F., M.D., LL.D. 1902.

1890.—Murray, Robert A., M.D. 112 West Eightieth Street, New York.

1904. Newell, Franklin Spilman, A.B., M.D. Outpatient Physician Boston Lying-in Hospital; Assistant Visiting Physician, Department of Gynecology, Boston City Hospital; Assistant in Obstetrics and Gynecology Harvard University. Boston, Mass.

1894.—Newman, Henry Parker, A.M., M.D. Professor of Obstetrics and Clinical Gynecology, College of Physicians and Surgeons of Chicago; Professor of Gynecology, Chicago Post-Graduate Medical School; Surgeon (Department of Diseases of Women) to St. Elizabeth, Post-Graduate, and Chicago Hospitals. 108 State Street, Chicago.

1891.—Noble, Charles P., M.D. Surgeon to Kensington Hospital for Women; Lecturer on Gynecology, Philadelphia Polyclinic. *Council*, 1899. 1509 Locust Street, Philadelphia.

1902.—Noble, George Henry, M.D. Gynecologist to Grady Hospital. Atlanta, Ga.

Founder.—*Noeggerath, Emil, M.D. Made Honorary Fellow 1888.

1893.—Norris, Richard C., A.M., M.D. Lecturer on Clinical and Operative Obstetrics, Medical Department, University of Pennsylvania; Physician-in-Charge, Preston Retreat; Gynecologist to the Methodist Episcopal Hospital and to the Philadelphia Hospital. 500 North Twentieth Street, Philadelphia.

1880.—Palmer, Chauncey D., M.D. Professor of Obstetrics, of the Medical and Surgical Diseases of Women, and of Clinical Gynecology in the Medical College of Ohio; Professor of Gynecology and of Clinical Gynecology in the Woman's State Hospital and Medical College; Obstetrician and Gynecologist to the Cincinnati Hospital. *Council*, 1888. Avondale, Cincinnati, Ohio.

1885.—†Parish, William H., M.D. 1903.

Founder.—*Parvin, Theophilus, M.D., LL.D. 1898.

Founder.—*Peasley, E. Randolph, M.D., LL.D. 1878.

1895.—Penrose, Charles B., A.M., Ph.D., M.D. 1331 Spruce Street, Philadelphia.

Founder.—†Penrose, Richard A. F., A.M., M.D., LL.D. 1885.

1897.—Peterson, Reuben, A.B., M.D. Professor of Gynecology and Obstetrics, University of Michigan; Gynecologist and Obstetrician to the University Hospital. Ann Arbor, Mich.

1881.—Polk, William M., M.D. Professor of Obstetrics and Diseases of Women and Children, Cornell University Medical College; Physician to Bellevue Hospital and to the Emergency Lying-in Hospital; Consulting Gynecologist to St. Luke's and St. Vincent's Hospitals. *Vice-President*, 1890. *Council*, 1891. *President*, 1896. 7 East Thirty-sixth Street, New York.

1892.—Pryor, William R., M.D. Professor of Gynecology at the New York Polyclinic Medical School and Hospital; Visiting Gynecologist to St. Elizabeth's Hospital. *Council*, 1901–1903. 6 West Eighty-fourth Street, New York.

1877.—Reamy, Thaddeus A., A.M., M.D., LL.D. Professor of Clinical Gynecology in the Medical College of Ohio; Gynecologist and Obstetrician to the Cincinnati Hospital; Gynecologist to the Good Samaritan Hospital; Surgeon to the Woman's Hospital, Cincinnati; Consulting Gynecologist

to Christ's Hospital; Consulting Gynecologist to the Ohio State Hospital for Women; Fellow of the Medico-Chirurgical Society of Philadelphia; Corresponding Member of the Boston Gynecological Society. *Vice-President*, 1881. *Council*, 1884. *President*, 1886. Oak Street, Cincinnati.

Founder.—Reeve, John C., M.D., LL.D. Made Honorary Fellow 1897.

1890.—Reynolds, Edward, M.D. Physician to the Boston Lying-in Hospital, Out-patient Department; Assistant in Gynecology, Boston City Hospital; Instructor in Obstetrics and Assistant in Gynecology, Harvard University. *Council*, 1894, 1898. 130 Marlborough Street, Boston.

1887.—†Reynolds, John P., M.D. 1896.

Founder.—Richardson, William L., M.D. Made Honorary Fellow 1903.

1892.—†Ritchie, Park, M.D. 1894.

1896.—Robb, Hunter, M.D. Professor of Gynecology, Western Reserve University. 702 Rose Building, Cleveland, Ohio.

1879.—*Scott, John, M.D., M.R.C.S.I. 1886.

Founder.—*Sims, J. Marion, M.D., LL.D. 1883.

Founder.—†Sinclair, Alexander D., M.D. 1894.

Founder.—*Skene, Alexander J. C., M.D. 1900.

Founder.—*Smith, Albert H., M.D. 1886.

1892.—Smith, A. Lafthorn, A.B., M.D., M.R.C.S. (Eng.). Fellow of the London Obstetrical Society; Fellow of the Société de Médecine Pratique, Paris; Professor of Clinical Gynecology in Bishop's College; Surgeon-in-Chief to Samaritan Free Hospital for Women; Gynecologist and Consulting Surgeon to the Montreal Dispensary; Gynecologist to the Western Hospital; Professor of Surgical Diseases of Women in the University of Vermont. 250 Bishop Street, W., Montreal, Canada.

1898.—Stone, Isaac S., M.D. Clinical Professor of Gynecology, University of Georgetown; Gynecologist to the Columbia Hospital for Women; Fellow of the British Gynecological Society. 1449 Rhode Island Avenue, N. W., Washington, D. C.

Founder.—*Storer, D. Humphreys, M.D. 1903.

1891.—*Strong, Charles P., A.B., M.D. 1893.

1879.—Sutton, R. Stansbury, A.M., M.D., LL.D. Consulting Gynecologist to Passavant Hospital; Associate Fellow

of the Philadelphia Obstetrical Society; Fellow of the British Gynecological Society; Member of the International Gynecological Society. *Council*, 1884. *Vice-President*, 1897. Stevenson Building, 341 Sixth Avenue, Pittsburg.

Founder.—*Taylor, Isaac E., M.D. Made Honorary Fellow 1888.

Founder.—*Thomas, T. Gaillard, M.D. 1903.

1898.—Thompson, John T., A.M., M.D. Professor of Diseases of Women, Bowdoin School for Medical Instruction; Surgeon to the Maine General Hospital. 211 State Street, Portland, Maine.

Founder.—*Trask, James D., M.D. 1883.

1879.—†Underhill, J. W., M.D. 1886.

Founder.—Van de Warker, Ely, M.D. Surgeon to the Central New York Hospital for Women; Surgeon to the Syracuse Woman's and Children's Hospital. *Council*, 1885, 1889, 1896. *Vice-President*, 1889. *President*, 1901. 104 Fayette Park, Syracuse, New York.

1897.—Vineberg, Hiram N., M.D. Attending Gynecologist to St. Mark's Hospital; Gynecologist to Mt. Sinai Hospital Dispensary; Gynecologist to the Montefiore Home for Chronic Invalids. 751 Madison Avenue, New York.

1903.—Wakefield, W. Francis B., M.D. 667 Sutton Street, San Francisco.

Founder.—*Wallace, Ellerslie, M.D. 1885.

1891.—Wathen, William H., A.M., M.D., LL.D. Professor of Abdominal Surgery and Gynecology in the Kentucky School of Medicine; Ex-President of the Section on Obstetrics and Gynecology of the American Medical Association; Ex-President of the Kentucky State Medical Society; Fellow of the Southern Surgical and Gynecological Society; Gynecologist to the Louisville City Hospital and to the Kentucky School of Medicine Hospital. 628 Fourth Avenue, Louisville, Ky.

1896.—Watkins, Thomas J., M.D. Attending Gynecologist to St. Luke's, Lakeside, and Provident Hospitals, Chicago; Consulting Gynecologist to Silver Cross Hospital, Joliet, Ill.; Clinical Instructor in Gynecology, Northwestern University Medical School. 3564 Grand Boulevard, Chicago.

1898. — Webster, J. Clarence, B.A., M.D. (Edin.), F.R.C.P.E. Professor of Obstetrics and Gynecology, Rush Medical College, University of Chicago; Fellow of the Royal

Society of Edinburgh; Fellow of the Edinburgh Obstetrical Society; Corresponding Member of the Royal Academy of Palermo, Italy, and of the Italian Obstetrical and Gynecological Society. 706 Reliance Building, 100 State Street, Chicago.

1902.—Wells, Brooks H., M.D. Professor of Gynecology in the New York Polyclinic Medical School and Hospital. 34 West Forty-fifth Street, New York.

Founder.—*White, James P., M.D. 1881.

1892.—Williams, J. Whitridge, A.B., M.D. Professor of Obstetrics, Johns Hopkins University; Gynecologist to Union Protestant Infirmary. *Council*, 1899. 1128 Cathedral Street, Baltimore.

1887.—*Wilson, Elwood, M.D. 1889.

Founder.—*Wilson, Henry P. C., M.D. 1898.

1886.—Wylie, W. Gill, M.D. Professor Emeritus of Gynecology, New York Polyclinic Medical School and Hospital; Gynecologist to Bellevue Hospital; Consulting Surgeon to the Methodist Episcopal Hospital, Brooklyn; Fellow of the British Gynecological Society. 28 West Fortieth Street, New York.

Total, 89 Active Fellows.

MINUTES OF THE PROCEEDINGS

AT THE

TWENTY-NINTH ANNUAL MEETING

OF THE

AMERICAN GYNECOLOGICAL SOCIETY,

HELD IN THE NEW MEDICAL LIBRARY,

Boston,

MAY 24, 25 AND 26, 1904.

TWENTY-NINTH ANNUAL MEETING.

BOSTON, MASS., TUESDAY, WEDNESDAY, AND THURSDAY,
May 24, 25 *and* 26, 1904.

The following members were present:

WILLIAM EASTERLY ASHTON,	Philadelphia.
WILLIAM H. BAKER,	Boston.
J. MONTGOMERY BALDY,	Philadelphia.
HERMANN J. BOLDT,	New York.
J. WESLEY BOVÉE,	Washington.
B. BERNARD BROWNE,	Baltimore.
AUGUSTUS H. BUCKMASTER,	Charlotteville.
HENRY T. BYFORD,	Chicago.
JAMES R. CHADWICK,	Boston.
JOHN G. CLARK,	Philadelphia.
HENRY C. COE,	New York.
EDWIN B. CRAGIN,	New York.
ANDREW F. CURRIER,	New York.
ERNEST W. CUSHING,	Boston.
FRANCIS H. DAVENPORT,	Boston.
EDWARD P. DAVIS,	Philadelphia.
ROBERT L. DICKINSON,	New York.
E. C. DUDLEY,	Chicago.
A. PALMER DUDLEY,	New York.
EDWARD L. DUER,	Philadelphia.
GEORGE M. EDEBOHLS,	New York.
J. CLIFTON EDGAR,	New York.
BACHE MCE. EMMET,	New York.
J. DUNCAN EMMET,	New York.
WILLIS E. FORD,	Utica.
HENRY D. FRY,	Washington.
J. RIDDLE GOFFE,	New York.
SETH C. GORDON,	Portland.
EGBERT H. GRANDIN,	New York.
CHARLES M. GREEN,	Boston.
PHILANDER A. HARRIS,	Paterson.

Phineas H. Ingalls,	Hartford.
Joseph E. Janvrin,	New York.
Howard A. Kelly,	Baltimore.
A. F. A. King,	Washington.
Beverly MacMonagle,	San Francisco.
Walter P. Manton,	Detroit.
Charles P. Noble,	Philadelphia.
George H. Noble,	Atlanta.
Charles B. Penrose,	Philadelphia.
Edward Reynolds,	Boston.
Hunter Robb,	Cleveland.
A. Lapthorn Smith,	Montreal.
R. Stansbury Sutton,	Pittsburg.
John T. Thompson,	Portland.
Ely Van de Warker,	Syracuse.
Hiram N. Vineberg,	New York.
W. F. B. Wakefield,	San Francisco.
Thomas J. Watkins,	Chicago.
J. Clarence Webster,	Chicago.
Brooks H. Wells,	New York.
J. Whitridge Williams,	Baltimore.

First Day.—*Tuesday, May* 24, 1904.

Morning Session.—The Society met in the Medical Library, under the Presidency of Dr. Edward Reynolds, of Boston, and was called to order at 10 A.M.

The address of welcome was delivered by Dr. Charles M. Green of Boston.

Address of Welcome by Dr. Green.

Mr. President and Fellows of the American Gynecological Society: The Fellows of the Society resident in Boston have accorded to me the honor of extending to you a welcome to our city, and this I do most cordially. We recall the former occasions on which the Society has met with us here, and we hope that the present meeting will be no less pleasant and profitable.

I welcome you, too, in behalf of the Fellows of the Obstetrical

Society of Boston, whose guests we are to be this evening. We purpose taking you to Cambridge. The time at your disposal is much too brief for more than a glance at Harvard College; and, although the museums will all be open to your inspection, you will obtain only an impression of the rich treasures they contain. But you will have an opportunity to visit Memorial Hall, around which cluster the memories of the love of country and self-devotion of Harvard men in the Civil War; you may wish to inspect the new Stadium, the center of the athletic interests of the college; and we will dine at the Harvard Union, the democratic, social meeting-place for all who enter the college gates. Altogether, we hope that it may interest those of you who are not alumni of Harvard to visit the spot so dear to Harvard men, from which so many generations have drawn their inspiration.

I am not authorized to speak for the general profession of Boston, but knowing as I do the interest taken by them in our meetings, and the pleasure it gives them to meet you socially, I know that in welcoming you to Boston I only give expression to their thought.

We have often been told that Boston is a small and decidedly provincial city, and therefore the Boston Fellows have this year sought to enlarge their social area by accepting the co-operation of the Fellows resident in Maine and Connecticut, and thus I am enabled, gentlemen, to bid you welcome to all New England.

You are very well aware that you have come to a city rich in historic interest, and some of you visit us for the first time. In these three days the proceedings of our Society will leave you no time for general sight-seeing, but those of you who may be able to remain longer will find much to reward you. In the heart of the old city stand the old State House and Faneuil Hall—the former containing the priceless collection of the Bostonian Society, and the latter, the Cradle of Liberty, interesting not alone in itself and the memories that cluster round it, but in the valuable military collection of the Colonial Ancient and Honorable Artillery Company. Near by are the old South Church, the home of Paul Revere, and the North Church, from whose belfry were hung the lanterns for whose glimmer Revere waited on the opposite shore. Near by, too, is the site of the Green Dragon Tavern, so appropriately called the hot-bed of

the Revolution. Over the river stands Bunker Hill; and a pleasant trolley ride will take you to Lexington and Concord. If your time permits, I would commend to your notice the Hall of Flags in our Bullfinch State House, and the beautiful memorial to Colonel Shaw and his negro troops under the opposite elms on Boston Common. You will also find in the Cadet Armory, on Columbus Avenue, the library of the Military Historical Society, containing the finest collection of Napoleana outside of France, and the Museum of the Military Order of the Loyal Legion, with its priceless relics of the Civil War.

But, gentlemen, a long and interesting program awaits you, and I ought to delay you no longer. Once more a cordial welcome and many happy returns.

Response by Dr. Henry T. Byford.

Mr. President and Fellows of the American Gynecological Society: I think I voice the sentiments of the Fellows of this Society when I say we reciprocate the cordial greetings and accept the hospitality which has been extended to us.

The indications are that we shall have a very enjoyable time. We are to have free luncheons; we are to have a reception and a banquet, and I think I speak for the Fellows in attendance when I say that we shall try to do justice to this not unimportant part of the program. We have also a rather extensive scientific entertainment for this meeting. I find that, in addition to the regular symposia, there are twenty papers: ten upon diseases of the female genitalia and ten on diseased conditions within the abdominal cavity. The program, therefore, is varied and broad.

It is not only a pleasure, but an honor, to be entertained by our local confrères and the people of Boston; a city that is representative of the best; a city celebrated for its statesmen, soldiers, orators, poets, politicians, and even noted for its baseball players and pugilists. (Laughter.)

This Society was founded by pioneer gynecologists, and its records constitute a history of the progress of gynecology. All but two or three of the founders have passed away, or have retired and left the active work to us, the junior members. And if our program may be taken as representative, we may surely

claim to be active and progressing. We have fought our way out of the pelvis and are attacking the abdominal cavity with the same vigor and success that the Japanese are invading the bowels of Russia. We are not only busy with our knives, but busy with our pens. We have already invaded two continents with pelvic literature, and are about to inundate them with abdominal literature. Our work is not yet finished.

In conclusion, on behalf of the Society, I wish to thank the Boston members and those of the Boston Obstetrical Society for the preparations they have made for our entertainment, for the cordiality with which they have received us, and for the pleasures they may have in store for us.

On motion, the following were made members by invitation: Dr. Newman B. Nobles, of Cleveland; Dr. George Gellhorn, of St. Louis; Dr. Isaac C. Dickson, of Baltimore; Dr. Daniel H. Craig, of Boston; Dr. W. L. Cousins, of Portland, Maine; Dr. Alfred King, of Portland, Maine; Dr. William S. Stone, of New York; Dr. I. E. Atkinson, of Baltimore, and Dr. C. E. Thomson of Scranton, Pa.

Papers were read as follows:

1. "The Treatment of Gallstones Found as Coincidents in Abdominal or Pelvic Surgery," by Dr. John W. Clark, of Philadelphia.

Discussed by Drs. Sutton, Edebohls, Dudley, Wells, Gordon, Vineberg, Baldy, Manton, MacMonagle, and by the essayist.

2. "Report of a Case of Ovarian Pregnancy," by Dr. J. Clarence Webster, of Chicago.

Discussed by Drs. Williams, Thompson, Davis, Clark, Smith, and the essayist.

3. "Ureterolithotomy," by Dr. J. Wesley Bovée, of Washington, D. C., which was discussed by Drs. Brown, Noble, Ford, MacMonagle, Dickinson, Harris, Edebohls, and closed by Dr. Bovée.

4. "Nephrectomy for Primary Tuberculosis of the Kidney, with a Report of Four Cases," by Dr. Hiram N. Vineberg, of New York.

Discussed by Drs. Janvrin, Bovée, Harris, Gordon, Baldy, Edebohls, Goffe, Reynolds, and the essayist.

On motion, the Society adjourned until 2.30 P.M.

Afternoon Session.—The Society re-assembled at 2.30 o'clock, with the President in the Chair.

1. "Hypertrophies and Inflammations about the Urinary Meatus," by Dr. Robert L. Dickinson, of Brooklyn.

2. "The Surgery of the Urethra," by Dr. Ely Van de Warker, of Syracuse.

These two papers were discussed jointly by Drs. Watkins, Noble, Buckmaster, Smith, Emmet, Manton, Kelly, Gellhorn, Dickinson, and Van de Warker.

3. "Pyelitis Complicating Pregnancy," by Dr. Edwin B. Cragin, of New York.

Discussed by Drs. Dickinson, Noble, Davis, Smith, Fry, Kelly, Vineberg, and the essayist.

4. "A Second Case of Renal Decapsulation for Puerperal Eclampsia," by Dr. George M. Edebohls, of New York.

Discussed by Drs. Fry, Vineberg, Cragin, Dickinson, Davis, and the author.

Dr. A. Palmer Dudley, of New York, exhibited drawings and specimens of implantations of the ovary.

On motion, the Society adjourned until Wednesday.

SECOND DAY.—*Wednesday, May* 25, 1904.

Morning Session.—The Society was called to order at 9.30 o'clock by the President.

The next order was a symposium on "The Treatment of Recent Injuries to the Genital Canal." Papers were read as follows:

1. "The Primary Repair of Lacerations of the Cervix," by Dr. Edward P. Davis, of Philadelphia.

2. "The Practice of Cervix Repair Five Days after Delivery," by Dr. Robert L. Dickinson, of Brooklyn.

3. "General Considerations of Repair of the Cervix," by Dr. J. Montgomery Baldy, of Philadelphia.

The symposium was discussed by Drs. Byford, Smith, Cragin, Dudley, Edgar, Coe, Williams, Boldt, Currier, Ford, Craig (Boston), Wakefield, Emmet, Webster, Watkins, and the essayist.

4. "Incomplete Rupture of the Uterus," by Dr. J. Whitridge Williams, of Baltimore.

Discussed by Drs. Coe, Cragin, Davis, Webster, Buckmaster, Dickinson, and Williams.

At this juncture the First Vice-President, Dr. Williams, took the Chair, and President Reynolds delivered his address.

Following the Presidential Address, there was a symposium on "Injuries to the Perineum," and papers were read as follows:

(*a*) "The Preventive Treatment of Pelvic Floor Lacerations," by Dr. J. Clifton Edgar, of New York.

(*b*) "Immediate Repair of Lacerations of the Perineum, with Special Reference to Placing the Sutures Before the Lacerations Occur," by Dr. Lapthorn Smith, of Montreal.

(*c*) "Recent Lacerations of the Pelvic Floor," by Dr. Henry C. Coe, of New York.

The symposium was discussed by Drs. Cragin, Cushing, Emmet, Davis, Van de Warker, King, Vineberg, and the essayists.

On motion, the Society adjourned until 2.30 P.M.

Afternoon Session.—The Society re-assembled at 2.30 o'clock, with the President in the Chair.

1. "Uniformity in Pelvic and Cranial Measurements," by Dr. A. F. A. King, of Washington, D. C.

Discussed by Drs. Harris, Edgar, Williams, Van de Warker, and the essayist.

At the conclusion of Dr. King's paper, he asked for the appointment of a committee, to report next year, concerning the adoption of a simple standard in pelvic and cranial measurements. Accordingly, a motion was made and carried that such a committee be appointed.

The President appointed as this committee, Drs. A. F. A. King, J. Whitridge Williams, and E. P. Davis.

In a symposium on the "Value of Non-operative Local Treatment in Gynecology," the following papers were read:

(*a*) "The Value of Local Treatment, *Per Se*," by Dr. Willis E. Ford, of Utica.

(*b*) "The Value of Non-operative Local Treatment in Pelvic Disorders," by Dr. Walter P. Manton, of Detroit.

(*c*) "The Value of Local Treatment Preparatory to Operation," by Dr. Henry C. Coe, of New York.

(*d*) "The Value of Postoperative Local Treatment," by Dr. J. Riddle Goffe, of New York.

The symposium was discussed by Drs. Vineberg, Emmet, Gordon, Boldt, Currier, and closed by Drs. Ford and Goffe.

2. "The Implantation of the Human Ovum in the Uterus," by Dr. Charles Sedgwick Minot, of Boston, Mass., by invitation.

On motion of Dr. Kelly, a vote of thanks was extended to Dr. Minot for the interesting and instructive presentation of the subject.

Executive Session.

The Society convened in executive session in the Hall of the Medical Library, at 5 o'clock P.M., Wednesday, May 25th, the President, Dr. Reynolds, presiding. A quorum was present. The minutes of the last meeting were presented by the Secretary and approved. The report of the Treasurer, Dr. Baldy, was then read, showing a cash balance on hand of $727.34. Drs. Fry and Robb were appointed a Committee of Audit, and reported later that the records were correct.

The following amendments, proposed and seconded at the last meeting, were presented and carried by vote of the Society: (*a*) Add to paragraph 4 of Section IV., "and shall be so classified in the next volume of Transactions, provided the request be made during the fiscal year for which the annual dues have been paid by that member."

(*b*) Modify Section VI. to read: "The annual meeting of the Society shall be held regularly on the fourth Tuesday of May, and shall continue for three days, unless otherwise ordered by vote of the Society at any executive session.

(*c*) Change Section II. to read as follows: "The object of this Society shall be the promotion of knowledge in all that relates to the Diseases of Women, to Obstetrics, and to Abdominal Surgery.

The Secretary reported the death of our Honorary Fellow, Mr. Knowsley Thornton, of London, which occurred January 19, 1904; also the death of our esteemed Fellow, Dr. George J. Engelmann, who died of pneumonia, November 16, 1903.

The Secretary reported that, in accordance with the vote of the Society at the last meeting, he had been disposing of the accumulated volumes of the Transactions by sale and by gift

to prominent medical libraries of the country. There were still some volumes remaining on hand, and the Council by vote recommended that the remaining copies of the Society Album be held for purchase by new members at $5.00 per copy; and if any order for a copy is received, the portraits and biographies of all the new members up to date of order be added to the volume, and a copy bound; that the copies of Vol. XXVIII. of the TRANSACTIONS be held for sale to new members at $2.00 per volume, and for general sale at $5.00 per volume; that five sets, as complete as possible, be held for sale to members only at $2.00 per volume; that the remaining miscellaneous copies be distributed to medical libraries through the "Association of Medical Libraries." This action of the Council was approved by vote of the Society.

The Council made the following report to the Society:

The Council has considered the subject of the relation of our Society to the Congress of American Physicians and Surgeons; it has corresponded with the constituent societies of the Congress, and finds there exists a general feeling among them that the organization of the Congress or the conduct of its meetings might be modified with advantage to themselves and to the Congress. The subject was then brought to the attention of Dr. Keen, President of the Congress. It has finally been decided to refer the matter to the next Executive Committee of the Congress, and the various constituent societies have been notified to instruct their delegates to that committee which are to be elected this year what recommendations to make, and report to their respective societies in 1905.

On motion, this subject was referred by the Society to the Council, with power to instruct the delegate.

Dr. Edward Reynolds was elected delegate to represent the Society on the Executive Committee.

On motion, the Society voted to send, through the Secretary, its expression of affectionate regard to Dr. Thomas Addis Emmet and Dr. William T. Howard; also words of sympathy and cordial greeting to our Fellow, Dr. Burrage, who, after a year's desperate sickness from septicemia, was just recovering his health.

The Council recommended for election to Fellowship: Dr.

Thomas S. Cullen, of Baltimore; Dr. George Gellhorn, of St. Louis; Dr. Franklin S. Newell, of Boston, and Dr. Palmer Findley, of Chicago. The separate ballots resulted in the election of all.

The following officers were elected for the ensuing year:

President—E. C. Dudley.
First Vice-President—Henry D. Fry.
Second Vice-President—Henry C. Coe.
Treasurer—J. M. Baldy.
Secretary—J. Riddle Goffe.
Member of the Council—Edward Reynolds.

It was moved and carried that the plan of program suggested in the President's address be referred to the Council, with the following instructions: A Fellow desiring to present a paper shall be required to send to the Secretary, at least one month before the meeting, an abstract of his paper; that the completed paper shall be unrestricted in length; that the length of the abstract shall be determined by the Council for the different classes of papers, which shall not in any case exceed fifteen minutes; that the abstracts only shall be read at the meeting. This was unanimously carried.

Adjournment.

THIRD DAY.—*Thursday, May* 26, 1904.

Morning Session.—The Society met at 9.30 o'clock, with the President in the Chair.

1. "Bathing during Menstruation," by Dr. J. Clifton Edgar, of New York.

Discussed by Drs. Goffe, Baker, Gordon, Fry, MacMonagle, and the essayist.

2. "The Streptococcus in Connection with Gynecologic Surgery," by Dr. Hunter Robb, of Cleveland.

3. "Nature of Indications for Operation in Fibromyomata of the Uterus," by Dr. Charles P. Noble, of Philadelphia.

Discussed by Drs. Williams, MacMonagle, Gordon, Davis, Thompson, Smith, Kelly, and Noble.

4. "The Treatment of Gonorrhea," by Dr. Henry T. Byford, of Chicago.

Dr. Philander A. Harris, of Paterson, N. J., exhibited a new uterine obstetric dilator.

The retiring President, Dr. Reynolds, said: We have discussed every paper whose author was present, in all, twenty-nine papers. We have never been behind time, and we have finished ahead of time. I feel that I personally ought to express my warm thanks to the Fellows for the readiness and spirit with which they have supported the Chair. The gavel has fallen but three times in the course of the meeting, because gentlemen had reached their time limit; only one gentleman has exceeded his time, his limit having been extended by the courtesy of the Society.

It now becomes my pleasant duty to present—I need not say introduce—your old friend and associate, the President-elect, Dr. E. C. Dudley, of Chicago. (Applause.)

Dr. Dudley, in accepting the Presidency, said:

Mr. President, Ladies and Gentlemen: To make remarks before people ordinarily gives me a choking sensation in the throat, and the situation at present is intensified.

I need not say that I esteem it a very great honor, one of the greatest honors which can befall an American physician or surgeon, to be elected President of this Society; and after this hotly contested election, I desire to express my gratification to the Fellows. I am especially gratified at having been selected as your presiding officer for the coming year, as a representative of the West; and I feel that in being so selected the honor is not mine, except as one of the Fellows of the West. This gratification is increased by the fact that the honor comes to me as an absolute surprise, which shows that the Society is still going forward on an absolutely non-political basis, which, I am sorry to say, is not true of all scientific bodies. I am further gratified because this honor comes to me in my own native State of Massachusetts. In thanking you, of course, one cannot say much more than "thank you," but I do thank you, and thank you with all the sense of obligation which the word implies. (Applause.)

On motion of Dr. Edward P. Davis, a vote of thanks was extended to the retiring President for his earnest labors and the impartial manner in which he had conducted the deliberations

of the meeting. A vote of thanks was also extended to the members of the Society from Boston, and the Boston Obstetrical Society, and the ladies and gentlemen of Boston for the cordial hospitality and entertainment of the Fellows.

There being no further business, the Society then adjourned, to meet at Niagara Falls, N. Y., the fourth Tuesday in May, 1905.

J. RIDDLE GOFFE,
Secretary.

CONSTITUTION.

I. This Society shall be known as the AMERICAN GYNECOLOGICAL SOCIETY.

II. The object of this Society shall be the promotion of knowledge in all that relates to the Diseases of Women, to Obstetrics, and to Abdominal Surgery.

FELLOWS.

III. The Fellows of this Society shall consist of Fellows and Honorary Fellows.

The Fellows shall not exceed one hundred in number.

The Honorary Fellows shall not exceed ten American and twenty-five foreign.

Candidates shall be proposed to the Council, by two Fellows *only*, at least one month before the first day of the meeting, each nomination being accompanied by a list of the principal publications of the candidate and of the official positions which he holds. Each candidate shall submit to the Council at least one month before the first date of meeting an unpublished paper upon some subject connected with gynecologic or obstetric science, and on nomination by the Council shall be balloted for at the annual meeting. A two-thirds affirmative vote of all the Fellows present shall constitute an election, at least fifteen Fellows being present. The names of any candidates not nominated by the Council or not elected by the Society shall be placed upon a waiting list and shall be reconsidered by the Council at each succeeding meeting. When the name of the candidate is placed upon the waiting list a copy of his paper shall be returned to him for publication if he so desires, but any such candidate shall have the privilege of submitting another paper to the Council a month before any succeeding annual meeting. A list of all the candidates, accompanied by all the information sent to the Council shall

be sent to every Fellow with the notification of the annual meeting.

No one shall be eligible for Active Fellowship until he shall have submitted to the Council a paper on some subject connected with gynecologic science.

HONORARY FELLOWS.

IV. The power of nominating Honorary Fellows shall be vested in the Council.

The election shall take place in the same manner as that of ordinary Fellows.

They shall enjoy all the privileges of other Fellows, but shall not be required to pay any fee or be allowed to hold any office or to cast any vote.

Any member of this Society at the end of twenty-five years' active service in the Society, or at any time thereafter, at his own request shall be placed on the roll of Honorary Fellows, and shall be so classified in the next volume of TRANSACTIONS, provided the request be made during the fiscal year for which the annual dues have been paid by that member.

OFFICERS.

V. The officers of the Society shall be a President, two Vice-Presidents, a Secretary, and a Treasurer, all to be elected annually, who, with four other Fellows, one to be elected each year for a term of four years, shall constitute the Council of the Society.

The nomination of all officers shall be made in open session at the business meeting, and the same shall be elected by ballot.

The officers shall enter upon their duties immediately before the adjournment of the meeting at which they were elected, and shall hold office for one year.

Any vacancy occurring between the annual meetings shall be filled temporarily by the action of the Council.

All officers shall be eligible for re-election.

ANNUAL MEETING.

VI. The annual meeting of the Society shall be held regularly on the fourth Tuesday in May, and shall continue for

three days, unless otherwise ordered by vote of the Society at any executive session.

AMENDMENTS.

VII. This Constitution may be amended by a two-thirds vote of all the Fellows present at an annual meeting, provided that notice of the proposed amendment has been given in writing at the annual meeting next preceding, and that the same has been printed in the notification of the meeting at which the vote is to be taken.

BY-LAWS.

PRESIDENT AND VICE-PRESIDENTS.

I. The President and Vice-Presidents shall discharge the duties belonging to their respective offices. The President shall be *ex-officio* chairman of the Council.

SECRETARY.

II. The Secretary shall attend and keep a record of all the meetings of the Society and of the Council, of which latter he shall be *ex-officio* clerk.

At each annual meeting he shall announce the names of all who have ceased to be Fellows since the last report.

He shall superintend the publication of the TRANSACTIONS, under the direction of the Council.

He shall notify candidates of their election to Fellowship.

He shall send notifications of the annual meetings and of the meetings of the Council.

TREASURER.

III. The Treasurer shall receive all moneys due, and pay all debts. He shall render an account thereof at the annual meeting, when an Auditing Committee shall be appointed to report.

COUNCIL.

IV. The Council shall meet as often as the interests of the Society may require.

Five members shall constitute a quorum.

It shall have the management of the affairs of the Society, subject to the action of the Society at its annual meetings.

It shall arrange the order for the reading of papers at the annual meetings.

It shall not have power to make the Society liable for any debts exceeding in total one hundred dollars in the course of any one year, unless specially authorized by a vote of the Society.

It shall have the entire control of the publications of the Society, with the power to reject such papers or discussions as it deems best.

The President, or any three members, may call a meeting, notice of which shall be transmitted to every member two weeks previous to the meeting.

The Council shall determine questions by vote, or—if demanded—by ballot, the President having a casting vote.

The Council shall constitute a Board of Trial for all offences against the Constitution and By-laws, or for conduct unbecoming an honorable physician, and shall have the sole power of moving the expulsion of any Fellow.

ORDER OF BUSINESS.

V. The Order of Business at the annual meetings of the Society shall be as follows:

I. General meeting at 10 A.M. each day.
   1. Reports of the Committees.
   2. Reading of Papers and Discussion of the same.

II. The Business Meeting, at which only Fellows of the Society shall be present, shall be held on the second day of the session, at an hour determined by the Council and announced on the program of the meeting. The Secretary's Record shall then be read; the Treasurer's accounts be submitted; the reports of Committees on other than scientific subjects be received; and all miscellaneous business be transacted.

PAPERS, ETC.

VI. The titles of all papers to be read at any annual meeting shall be forwarded to the Secretary not later than *two weeks* before the first day of the meeting.

No paper shall be read before the Society which has already been printed or has been read before another body.

All papers that may be read before the Society, and accepted for publication, shall become the property of the Society, and their publication shall be under the control of the Council. Such papers may be published in full in medical journals, provided that they are also printed in the TRANSACTIONS.

QUORUM.

VII. A quorum for business purposes shall be fifteen Fellows.

DECORUM.

VIII. No remarks reflecting upon the personal or professional character of any Fellow shall be in order at the annual meetings, except when introduced by the Council.

ASSESSMENTS.

IX. Every Fellow shall pay in advance the sum of fifteen dollars annually.

Any Fellow whose subscription shall be more than nine months in arrears shall be reminded of the fact by the Treasurer in writing; in event of payment not being then made, he may, on vote of the Council, be dropped from the Society.

Each Fellow shall pay on admission an initiation fee of twenty-five dollars.

Any Fellow who shall neither attend nor present a paper for three successive years shall, unless he offers an excuse satisfactory to the Society, be dropped from Fellowship.

AMENDMENTS.

X. Any of these By-laws may be amended, repealed, or suspended by a two-thirds vote of the Fellows present at any meeting; *provided*, previous notice in writing has been given at the annual meeting immediately preceding the one at which the vote is to be taken.

NOTE.

THE Society does not hold itself responsible for the views enunciated in the papers read at its meetings.

J. RIDDLE GOFFE, M.D., *Secretary*,
No. 29 WEST FORTY-SIXTH STREET, NEW YORK.

PAPERS

READ AT THE

TWENTY-NINTH ANNUAL MEETING

OF THE

AMERICAN GYNECOLOGICAL SOCIETY,

HELD IN THE

NEW BOSTON MEDICAL LIBRARY,

Boston, Mass.,

MAY 24, 25 AND 26, 1904.

THE PRESIDENT'S ADDRESS.

THE PRESENT STATUS AND FUTURE WELFARE OF THE SOCIETY.

By Edward Reynolds, M.D.,
Boston.

Fellows of the American Gynecological Society:

You will all remember that when Lincoln was asked to speak at the dedication of the National Cemetery on the battle-field of Gettysburg he embodied in his address the now familiar words: "The world will little note nor long remember what we say here, but it can never forget what *they did* here." The American Gynecological Society owes its pre-eminence along its chosen line less to the words than to the prolonged and daily labor of the eminent men who have composed it in the past, and must owe its future to the lifework of the equally able men who are to fill its membership in the coming years. He who has been elevated however unworthily to its presidency must necessarily feel, as he begins his Presidential Address, that what he has to say here will be of little note nor long remembered; and as he looks back along the line of his distinguished predecessors may well question whether he, too, can worthily occupy his allotted portion of your too scanty time. Yet he can but feel that so time-honored a custom as the delivery of a Presidential Address must have a well-established reason for its existence, and as he searches his thoughts for material that may be worthy of the occasion may well wonder what that reason is.

In the commercial world there is a custom which is universally conceded to be essential to prosperity, of devoting a periodic portion of its working time to the process known as "taking stock;" of pausing in its labors to estimate the present, to review the past, and from its failures or successes to forecast the future. Such, it seems to me, should be the purpose of our Presidential Address.

The President of the Society may not be, indeed, must often feel himself far from, the wisest or most devoted of its members, yet his fulfilment, during the year, of the duties of the office must necessarily have led him to give thought and consideration to many matters affecting the welfare of the Society, which, but for those duties, would hardly have attracted his attention. It is, therefore, fitting that he should have an opportunity of making to the Society such suggestions for the better guidance of its business as his work may have led him to conceive.

Among the many and striking changes in the habits of professional life which have occurred within the memory of the elder of you, indeed, among those which we younger men have noted even in the last two decades, we must be struck with the decreasing prominence of the medical society. With the increasing complexity of modern life in general the annual meeting has become far less the great event of the year than it was to our fathers. With the enormous and from many points of view regrettable increase in the number of medical publications, with the increasing prevalence of the habit of having everything come to the office desk, to be abstracted and prepared by assistants before it reaches the eyes of the chief, the actual hearing of the papers presented at any society has become of less pressing importance to all of us. There has been of late years a notable tendency toward consolidation of local societies and a consequent decrease in the number of meetings of which one is notified, or which he is expected to attend; and although geographical circumstances have as yet delayed the appearance of this

tendency among national societies, the signs of it are in the air. Few societies exist which do not worthily fill some special niche. Only such are likely to continue in the future, and we must keep an eye upon our laurels.

The main *raison d'etre* of such a society as this must, it seems to me, lie in the opportunity which it, and it only, presents to each of us of knowing and appreciating the abilities of a set of picked men coming from sections distant to us, of knowing and appreciating both the men and their work as we could not without these meetings; and to this end the written paper presented by one man is of far less value than the spoken and more informal debate which calls out the energies and develops the peculiarities of knowledge and ability, even of the foibles and weaknesses, of many men. It is in the discussion, rather than by the written paper, that we learn to know and appreciate each other.

Our program is always a crowded one, and it is desirable that it should be so, that it should guide the discussion through many phases of gynecologic work, and set forth the ideas of many men; but to insure full discussion of a varied and interesting list of papers demands year by year an increasing accuracy of organization. The twenty minutes' time which we now allot to each reader is already longer than is given by most scientific societies, and I think we have all noted that but few Fellows succeed in commanding the undivided attention of their audience for the whole of even this period of time. Yet we must not forget that the papers are afterward to reach a larger audience through publication, and that it is difficult, if not impossible, to worthily present an important topic within the limit which can be delivered in even a longer time. In this dilemma we may well turn to the collective experience of other societies, to the various expedients which one or another of them has adopted to meet their difficulties, and to a consideration of how such expedients as have been there found useful may be adapted to our peculiar needs.

The use of the printed abstract published beforehand has of late become increasingly prominent in many of our sister societies, and in the British Medical Association, the meetings of which have the reputation of being among the most successful and interesting of all societies, this use of the abstract has reached its highest terms. It is seldom wise to adopt wholesale the regulations of other organizations. It is usually better to let changes follow a more gradual and natural evolution under the needs of the individual assembly, but the methods of the English association may well be worth a passing consideration from you, and especially from those of you who must in their turn guide the destinies of our Society.

A Fellow of the British Medical Association who desires to present a paper at one of its meetings must put it in the hands of the secretary, complete and in the form in which he desires its publication, a number of weeks before the meeting, and the communication may be of any length he chooses. A paid secretary, a qualified and experienced medical author, then abstracts each paper into the form and length which he considers best fitted for spoken delivery. This official then reads the abstracts to the society as they are called from the program. Such a reading inaugurates each discussion, and the member whose ideas have been thus succinctly set before his associates takes part in the discussion and closes it. It is said that their experience shows that the ideas of the individual member are by this method better and more intelligibly presented to the society than if he had read to them his complete paper. The time of the society is economized, full debate is encouraged, and at the same time the member has the advantage of publishing to the world a paper in which his points are set forth to the fullest length and without time limitation. Such a method is, perhaps, too far advanced for our present needs or possibilities, yet it has many advantages, and has seemed to me worth calling to your attention as one toward which we might well advance. A similar method has

been adopted by common consent in the Association of American Physicians, and is spoken of with much enthusiasm by the members of that society. Would it not be wise for us to give this method, or a modification of it, a year's trial?

We must not underestimate the value of the other—the social side of our meetings—but, indeed, none of us is likely to forget or undervalue the warm friendships and charming half-hours which accrue to all of us from our membership in the Society.

In limiting the remainder of my address to the expression of my opinion that in the now crowded state of our programs it would be better for the Society that the conventional length of the Presidential Address should be curtailed, I feel that if I am right in this opinion it will be evidenced by the conduct of my successors in this honored office. If their course should show me wrong, may I hope that you will at least believe that I have not been actuated by any unworthy desire to curtail my own labors, but rather that I have been willing to risk the possibility of incurring such odium for what I believe to be the advantage of the Society.

In conclusion, may I take this opportunity of expressing to each and all of you my thanks for the kindly personal feeling which must have actuated you when you elected me to your Presidency, for which, and for the many personal pleasures which I have enjoyed in this Society, I am, and must always gladly remain, your willing debtor.

THE TREATMENT OF GALLSTONES FOUND AS A COINCIDENCE IN ABDOMINAL OR PELVIC OPERATIONS.

By John G. Clark, M.D.,
Philadelphia.

In a recent paper[1] read before the Chicago Gynecological Society I have briefly taken up some of the unsettled problems in abdominal surgery, and it is one of these that I have elaborated and wish to bring before you for discussion. What shall be our surgical attitude if gallstones are found as a coincidence with some other abdominal lesion for which the primary operation is performed? This subject is unquestionably a debatable one, and while I am following a fixed plan at present, I may see reasons, in the future, to change my viewpoint.

If we are to accept the much-quoted statement that 95 per cent. of gallstones produce no symptoms, then in each 100 cases in which gallstones are removed as a coincident part of another operation, 95 may be looked upon as meddlesome surgery. Let us, however, not inadvisedly employ this statement, drawn from pathologic and dissecting-room records, as a text for cases as we see them, but let us go behind the conditions as they are presented at the time of an operation. Certainly no one would advise all individuals to have the appendix removed as a prophylactic measure

[1] Unsettled Questions in Abdominal Surgery. American Journal of Obstetrics, 1904, vol. xlix., No. 5.

against a possible attack of appendicitis, even if he knew that 1 per cent. or more of all persons would sooner or later have this disease; and yet, when the abdomen is opened for some other cause, many surgeons will hold that you run a very small risk and in the end will do much more good than harm by this additional operation. With a series of 120 of these cases in my own experience, with only one death, and that not attributable to the appendicectomy, and with the pathologic analysis of these cases before me, which show many more or less serious lesions, I feel fully justified in advocating this course.[1]

To reach a good working surgical rule in all debatable questions, each operator must take into consideration, first, the history of the disease, and, second, what he and others have accomplished in the operative treatment of these conditions.

In reviewing the recent literature on cholelithiasis I am impressed especially with one fact, and that is that our knowledge relative to the early stages of this disease is very indefinite. While many cases do not produce the classic symptoms as usually given in medical text-books, yet I am sure that as our knowledge concerning the etiology and

[1] In a histologic examination of 120 appendices removed as a coincident part of some other abdominal operation, the proportion of pathologic lesions was as follows:

Normal appendices	25
Periappendicitis	39
Appendicitis, catarrhal (15 mild, 3 chronic)	18
Appendicitis, chronic (4 mild)	18
Appendicitis, obliterative	8
Appendicitis, acute	4
Hyperplasia of lymphoid elements in appendix	2
Appendicitis, mild acute	3
Fecal concretions in appendix	5
Appendicitis, interstitial	1
Carcinoma of appendix, primary	1
Pressure atrophy of appendical mucosa, due to kink	1
Constriction due to previous catarrhal disease	1

clinical course of gallstones increases, many symptoms which are now attributed to gastralgia, indigestion, functional disturbances of the gastrointestinal tract, etc., will be ascribed to the presence of gallstones, with associated infection, which is so frequently found in cholelithiasis.

Concerning the etiology of gallstones, three facts have been prominently brought forward in recent investigations: 1. That the bile, as formerly believed, is not bactericidal; (2) that the micro-organisms in the gall-bladder are predisposing if not absolute causative factors in the formation of gallstones; (3) when gallstones are present in the gall-bladder, infection in that viscus is much more likely to take place. It is a bacteriologic law that stagnation of any vital fluid around a foreign body predisposes to infection, and it would appear to be a just conclusion that even if the usually innocuous colon bacillus is present in the gall-bladder, associated with stagnant bile and gallstones, even though the classic symptoms, colic and jaundice, are not noted, the patient must at least suffer more or less from toxemia. This view will, I believe, sooner or later, be held by many leading physicians and surgeons. Musser,[1] who has been prominently identified with the medical side of this question, in his introductory remarks to a paper presented before the Congress of American Physicians and Surgeons says: "The era we are about to enter bodes for good. It looks as though we would go through the cycles of activity and inactivity, as in the earlier periods of appendicitis, in the treatment of gall-bladder infections." This writer especially called attention to the secondary manifestations of cholelithiasis, and strongly urged the early surgical intervention to prevent these sequels and complications. He says: "Let us see to it that the primary ailments are cared for, blocking thereby the oncoming of secondary conditions. Fifty years

[1] Medical and Surgical Aspects of the Diseases of the Gall-bladder and Bile-ducts. Transactions of the Association of American Physicians and Surgeons, 1903.

from now the secondary phenomena will be as rare as those which are secondary to disease now removed early, as cataract, appendicitis, vesical calculus, and a score of other conditions. Students of that day will marvel at the reports of cases of the present day." He then predicts that many cases diagnosed as tuberculosis, nephritis, and cardiac disease will be prevented because they are merely manifestations of terminal infections, the primary source of which is in the biliary apparatus. As yet no careful research work has been carried out to demonstrate this possible connection of pathologic conditions secondary to cholelithiasis.

Herter,[1] after reviewing the etiology of the disease, inclines strongly to the bacteriologic theory as to the origin of biliary calculi. He says: "It is plain from what has been said that there is at present no unequivocal evidence that gallstones arise from constitutional derangements unconnected with micro-organic invasions of the gall-bladder." To guard against a positive acceptance of this view, he makes the following qualifying statement: "While gallstones are commonly the result of local infections, we should carefully guard against the conclusion that they can never have a diathetic origin. It is at least highly probable that diathetic conditions are capable of so altering the composition of bile as to favor materially the production of calculi in the presence of suitable local bacterial activities."

Herter's paper, which is based upon his personal research and a most judicious analysis of the literature, leaves but little question as to the bacterial origin of gallstones.

If gallstones are once deposited in the gall-bladder, the favoring conditions for periodic or chronic infection are always present. In almost all cases of cholelithiasis which come to operation bacteria are discovered. Thus, Peterson, in fifty operations for gallstone, found micro-organisms forty-

[1] Etiology and Chemical Pathology of Gallstones. Transactions of the Association of American Physicians and Surgeons, 1903.

four times. In the majority of instances (36) the colon bacillus was found, and while we know, as a rule, that this is not a serious pathogenic micro-organism, yet it is capable of producing pus and of elaborating very depressant toxins. All of us have seen into what a wretched constitutional state a patient may fall who has a pelvic abscess in which only the colon bacillus is found.

There is, perhaps, no organ into which organisms may find their way more readily than into the gall-bladder, for there are three chief avenues of approach: (1) from bacteria circulating in the general blood stream and reaching the liver through the hepatic veins; (2) by the direct passage of bacteria into the common bile-duct from the duodenum; (3) by the transportation of bacteria from the intestine through the portal circulation.

Time and again experiments have shown that not only bacteria, but minute foreign granules may be deposited from the hepatic circulation in the biliary capillaries and transported directly to the gall-bladder.

The point, therefore, which I would make from the brief abstract of some of Herter's statements is that in every case of cholelithiasis the gall-bladder is a point of decided decreased resistance, and that bacteria are usually found either incorporated in the stones, actually free upon their surface, or in the stagnant bile. Can we, therefore, safely assume that, because none of the classic symptoms of gallstones have been present in a given case, there is no local or general deleterious impression being made upon the patient's health? If we go minutely into the analyses of our cases in which gallstones are found coincident with some more pressing surgical condition, I am certain we may do much to close up a gap in the clinical history of cholelithiasis. Herter appends a statistical note relative to the proportion of gallstones found in 2371 autopsies made in the Presbyterian Hospital of New York. In this number there were 179 cases (7.6 per cent.), of which 99 were in women and 80 in

men. As the percentage of males among the entire number of individuals subjected to autopsies was 65.5, the occurrence of cholelithiasis was, therefore, twice as often in men as in women. Only 7 cases occurred before the patient was forty years old, in men, whereas 26 were found in women before this age. In both sexes, therefore, by far the largest proportion of gallstones are found after forty years of age. So far as the actual history of gallstones is concerned, as evidenced by colic or obstructive jaundice, only 9 patients were noted as suffering from this disease in the autopsy protocols. It is a significant fact, however, that in 56 cases the liver was congested or nutmeg; in some of these the liver was also fatty or cirrhotic; the liver was excessively fatty in 28 and cirrhotic in 20 cases. All but 6 of the 28 cases of fatty liver occurred in women, and a large proportion of these were over forty. New-growths were present in the liver in 9 cases; abscesses existed in 6 cases. If, therefore, we lay stress upon the points made by Musser relative to the secondary manifestations of cholelithiasis, we must strongly incline to the belief that some of these pathologic conditions in the liver were secondary to the gallstone disease.

Dock, of Ann Arbor, in his discussion before the Congress of American Physicians and Surgeons, speaks first of the class of cases of gallstones which are easily recognizable, and which only carelessness or ignorance would prevent the physician from sending to the surgeon. He next refers to those cases in which all of the ordinary symptoms may be absent, or those present may resemble appendicitis or renal colic. Most of them, he says, may easily be differentiated by a careful examination, but some cases will still remain obscure and will have to be cleared up by the surgeon. Some of these cases have no history of gallstone disease, and many of them do not come to autopsy at all, so that the pathologist does not have an opportunity of studying them. He says that more has been learned from the surgeon

than from the pathologist in these cases, and he ventures the opinion that still more will be learned in this way. He has been particularly impressed with the cases of stomach disease which stimulate gallstone disease, and with diseases of the biliary tract involving the stomach.

To determine the frequency of gallstones, Celia D. Mosher has made an analysis of the records of 1655 autopsies in the Johns Hopkins Hospital, of which 1038 were on males and 617 on females. Of the total number, 6.4 per cent. were found to have stones. This corresponds to the smallest prevalence reported in Europe. The majority of the cases occurred after thirty years and the maximum was reached after the age of forty. The condition is less frequent in the colored than in the white race, and men were only affected five-ninths as often as women. Examination of the records of the Bayview Asylum shows that paupers there have gallstones twice as often as the hospital patients. As to the greater prevalence in women, she thinks it may be due to tight lacing and the wearing of belts.

Dr. Kelly[1] has for some time been in the habit of examining for gallstones, and also into the condition of the appendix in all cases of laparotomy, and has found gallstones present in 8 per cent. of all his patients, and they are especially coincident with ovarian tumors.

The error which I believe is concealed in the statement that in 95 per cent. of cases of cholelithiasis the patients have not suffered from symptoms, arises from the fact that these are all from autopsy or dissecting-room observations. Of course, the statistics derived from the latter source are worthless, except for the bald fact that in a given number of cadavers a certain percentage of gallstones may be present. Likewise the clinical history is frequently absent, or is usually not appended to the pathologic records. I believe, therefore, when we take into consideration the possibility

[1] Journal of American Medical Association, vol. xxxvi. p. 756.

of a serious fallacy in these general statements, and also, further, that even in cases in which operation is done for gallstone attacks, colic and jaundice are frequently absent, and that all of our most astute clinicians admit that there is a wide hiatus in the clinical histories of so-called latent cases, it falls within the province of every abdominal surgeon to look carefully into all cases in which it is feasible, to discover (1) whether gallstones are present; (2) to ascertain fully all symptoms which have been ascribed to disturbances of digestion; and (3) to determine whether we are justified in removing these foreign bodies if they are found.

I have not gone minutely into the various phases of gallstone disease in this paper, my purpose being merely to point out the deficiencies which are yet quite evident in this clinical chain.

Is the mortality attending these coincident operations so great that the operation should not be performed? Let us see what statistics show in cases which are forced to operation by acute symptoms.

In Mayo's large series of cases there were 208 operations for uncomplicated stones in the gall-bladder, with a mortality of less than 1 per cent. Kehr says that among his patients who had gallstones in the gall-bladder the mortality did not exceed 1 per cent. Mayo Robson, in the preface to the last edition of his book, says: "When the operation has been undertaken for simple diseases, such as gallstones, in the absence of cancer and jaundice, with suppurative or infective cholangitis, the mortality has only been 1.06 per cent."

Do these statements not promptly settle the question as to the very small danger attending the simple operations? Before alluding to my own experience in a comparatively short series of coincident operation, attention should especially be drawn to the fact that the more urgent symptoms of the gynecologic condition may obscure those pointing to

the gall-bladder. Here especially a gynecologic myopia may be so pronounced that only the pelvic lesion is seen; therefore there should be the fullest breadth to our histories and to our abdominal examinations. In abdominal surgery, even after the incision is made, the classic statement "he who diagnoses well, treats well," is especially in force. To draw specific attention, therefore, to the question in hand, we must not forget that when a woman consults us it is because she is a suffering individual, and if gallstones are associated with some other pelvic or abdominal lesion, we cannot by any means rule out the cholelithiasis as a factor in her case, especially if digestive disturbances, as is frequently the case, are prominent symptoms. Gallstones, therefore, are by no means so likely to be a dormant factor in these individuals as they may have been during the life of the dissecting-room or autopsy subject.

If, as the operative statistics show, the mortality from simply cholecystotomy is so small, I believe operative intervention in the class of cases to which I allude is indicated, for, as I have stated, a new chapter may in this way be added to the history of the so-called dormant cases.

That the gallstones may be producing symptoms at the time of or very soon after the gynecologic operation I am convinced from my own experience. In one case, the history of which is appended to this paper, gallstones were unquestionably overlooked in two previous operations, one of which was performed by another surgeon and one by myself. In a second instance I have every reason to think that dormant gallstones, which subsequently caused the death of the patient, were present in a case of myoma uteri at the time a hysteromyomectomy was performed. The operation was difficult, and at its completion the routine cyclic examination was omitted. The patient died a year later from cholangitis, which was preceded by two classic gallstone attacks in quick succession. In a third case the second

operation revealed several gallstones, and I am certain from the subsequent history of the case that gastric symptoms, which have been relieved since the second operation, arose from this source. Bearing upon this point I have quite recently obtained the following interesting history from an office patient:

The patient, a married woman, aged thirty-five years, has a child aged twelve years. Shortly after marriage she had a miscarriage, and since then has never been well. Two miscarriages subsequently occurred, and then a full-term child was born. The labor was not instrumental; the patient, however, sustained a laceration which was repaired several years later. She has been a semi-invalid for the last nine years, during which time she has had four operations: First, nine years ago, a simple curettement. Second, eight and a half years ago, a suspension of the uterus. Third, six years ago, appendicectomy and Edebohls' operation for suspension of the right kidney. Fourth, amputation of the cervix uteri and herniotomy for ventral hernia. The patient unquestionably belongs to the neurotic class, but her history is very significant and suggests a strong probability that the source of her troubles has not been reached by any of these operations, for her chief complaint is and has been in the right hypochondriac region. She says there is always a burning sensation at this point, and at times there are acute exacerbations of pain. Black-and-blue spots periodically appear over the body, and for the last few years her complexion has been marred by yellow splotches and her face is becoming more sallow. When these attacks are persistent she loses flesh rapidly. The bowels are greatly constipated, alternating at times with diarrhea. Sometimes the alvine discharges are very black, and at other times she has had light-colored stools. Following the attacks of soreness in the right side she has chills. At the time of the nephrorrhaphy she says her pain was the same as it is at present.

She never vomits, but is frequently nauseated. From the time of her first operation she has had this persistent distress in the hypochondrium, and instead of being relieved by her various operations she has steadily grown worse. Her menstrual periods are regular, accompanied by pain in the right ovarian region; the flow persists a week to ten days. At times she is subject to great flatulence. Pelvic examination is negative. The abdomen is flat and more or less hypersensitive to touch, and this is especially marked in the hypochondriac region. The result of the nephrorrhaphy, so far as holding the kidney in position, is perfect. There is no palpable enlargement of the gall-bladder, but the liver dulness is slightly greater than normal. From the history one cannot positively say that she is not one of the persistently complaining, neurotic class, but I cannot resist the thought that she has had more or less chronic infection in the gall passages associated with cholelithiasis. Her physician is now prescribing treatment to meet this condition. If after three or four months her symptoms are not better, an exploratory section may be advised.

As to the operative technic in these combined operations it is usually simple, being essentially that recommended by Kelly. If gallstones are discovered, the gall-bladder is pushed up with one hand in the abdomen to a point against the anterior abdominal wall, where it can easily be reached by a short incision. The incision may be a longitudinal one through the outer border of the right rectus muscle, or one parallel with the lowest fixed rib, depending entirely upon the location of the gall-bladder. After the incision is made a gauze pack should be inserted to protect fully the peritoneal cavity from the possible escape of bile. The gall-bladder is pulled well up into the wound and opened by a small incision, when the calculi may be expressed with the abdominal hand or removed with a gallstone scoop. In some cases the gall-bladder has been sutured and dropped

back without an abdominal drain, in some it has been partially or wholly extirpated, while in others a cholecystostomy has been performed. While various operative procedures have been employed in the several cases upon which I have operated, in general, I should say that in simple cases the best interest of the patient will be conserved if a cholecystostomy is performed. If the gall-bladder is closed and dropped back without drainage there is always the danger of its rupture with subsequent peritonitis. To quote from my Chicago paper concerning the counter-indications to the examination of the gall-bladder, the rule may be stated as follows:

When the operation in the pelvis has been attended with the evacuation of pus, which if generally distributed in the peritoneal cavity might give rise to a peritonitis, this exploration should be omitted. When the patient is in a critical condition at the termination of the operation it should not be made. In cases in which operation is done for a simple condition when the clinical symptoms are clear cut and point definitely to but the one condition it should again be omitted.

Concerning old pelvic inflammatory cases in which the septic area in the pelvis is completely walled off by adhesions, the examination of the gall-bladder may be made immediately after the abdomen is opened, before the pelvic adhesions are broken up. In this way the danger of distributing the septic material may be avoided.

So far my experience has not been extensive, but with the histories of these cases before me, I feel that I am justified in pursuing this course. I am by no means dogmatic, however, and reiterate positively that this is a new and unsettled question.

Conclusions. 1. The usual statement that 95 per cent. of gallstones produce no symptoms is fallacious because it is drawn from autopsy and dissecting-room statistics.

2. Recent researches point very strongly to the bacteriologic origin of gallstones.

3. Bile is not bactericidal, for in the majority of cases of cholelithiasis micro-organisms of a more or less pathogenic nature are discovered.

4. Under these circumstances many more or less vague symptoms attributed to gastrointestinal or general constitutional disturbances may arise from toxins elaborated around these foreign bodies in the gall-bladder.

5. All clinicians admit that there is a wide hiatus in the clinical symptoms between the early formation of gallstones and the so-called classic attacks of biliary colic with jaundice.

6. Abdominal surgeons should make a most careful record of all gastrointestinal or hepatic symptoms and other vague epigastric pains and associate these with an examination of the gall-bladder, with a view to establishing a further link in the symptomatology of cholelithiasis.

7. As cholelithotomy in a large series of cases has been attended with less than 2 per cent. mortality, the coincident removal of gallstones with some other abdominal operation is not a hazardous undertaking.

8. In my series of cases, more than 50 per cent. have shown symptoms which could be unquestionably or with great assurance attributed to the presence of gallstones.

9. This coincident operation should be dictated by the most careful surgical judgment, for if the patient is in a critical condition from a prolonged operation, or the primary operation has been a septic one, this extra operation may be attended by serious results.

SYNOPSIS OF THIRTEEN CASES OF COINCIDENT GALLSTONE OPERATIONS.

From a review of the following synopsis of cases it will be seen that in three instances classic symptoms of gallstones were present; in four cases symptoms strongly suggesting gall-

stones were noted; while in six the symptoms were at most either very vague or absent altogether. In some of these negative cases, however, more or less discredit must be cast upon the histories, for details relative to the general condition were very meager or entirely overlooked in the concentration of the resident physician's queries upon the symptoms referable to the pelvic organs.

Case No.	Age, married or single.	Primary disease for which operation was performed.	Operation.	Symptoms attributable to primary disease.	Symptoms attributable to gallstones.	Result.
600	40 years; married.	Multilocular ovarian cyst.	Cystectomy; cholecystotomy.	Enlargement of lower abdomen to size of full-term pregnancy.	Seizure with severe epigastric colic one year before admission to hospital, which was diagnosed by physician as gallstones; has had two such attacks since; no certain history of jaundice; no vomiting; slight diarrhea.	Convalescence uneventful.
898	36 years; married.	Tubo-ovarian abscess.	Left salpingo-oophorectomy; cholecystotomy (12 gallstones removed).	Dragging pain; constant headache; extreme nervousness.	One year ago last February was seized with sharp pain in abdomen, which began below thorax, on right side, and extended through the abdomen to back; pain associated with nausea and vomiting; a few days later jaundiced; since this attack has had similar ones every two weeks; patient suffers with almost constant indigestion and severe constipation; urination painful.	After operation patient suffered with excessive nausea and pain in region of gall-bladder, with chill on 4th day, followed by rise in temperature and jaundice; these had disappeared by tenth day.
917	60 years; married.	Double multilocular ovarian cysts.	Hysterosalpingo-oophorectomy; cholelithotomy.	Repeated attacks of weakness and run-down feeling since menopause.	No definite history of gallstones; as the patient was more or less wretched before the cysts appeared, it seems possible that the cholelithiasis has been a factor in her ill-health.	Patient suffered with nausea and vomiting for several days after operation; was also constipated and had some pain over gall-bladder wound.
950	28 years; married.	Relaxation of pelvic floor; bilater'l laceration of cervix; erosion of cervix; par-ovarian cyst.	Dilatation and curetment; trachelorrhaphy; resection of relaxed vaginal outlet; cholecystectomy.	Since birth of first child has suffered with dragging pains in lower abdomen and small of back, with attacks of severe frontal headache.	Severe colic, centering below border of ribs in right mid-clavicular area; pain transmitted up to right shoulder, where it stopped; persistently nauseated, and vomiting became a very exaggerated symptom; no jaundice; patient has had these attacks every six or seven weeks for last four years; each attack longer and more severe than the preceding one.	Except for undue nausea and vomiting for first five days convalescence satisfactory.

1055	35 years; single.	Retroflexio uteri; appendicitis; parovarian cyst.	Cystectomy; appendicectomy; cholelithotomy; suspensio uteri.	More or less constant pain in left ovarian region, with backache and headache.	No symptoms attributable to gallstones.	Convalescence uneventful.
1061	43 years; married.	Myoma uteri.	Hysteromyomectomy; cholecystotomy.	Enlargement of and heaviness in the lower abdomen.	Nothing in the history of the patient's condition pointed to the presence of gallstones before the operation.	Convalescence uncomplicated until tenth day, when temperature became irregular, followed a few days later by discharge from cervical stump; subsequently made satisfactory recovery.
1069	38 years; married.	Retroflexio uteri; relaxation of pelvic floor.	Intraperitoneal shortening of round ligaments; cholecystectomy.	Pain directly over the symphysis pubis, appetite variable, and has been steadily losing weight; suffers considerably with frontal headache.	Severe pain in the epigastric region, especially marked over the lower region of the liver and gall-bladder; bowels markedly constipated.	Convalescence satisfactory.
1071	45 years; married.	Multilocular ovarian cyst; ascites.	Cystectomy; cholelithotomy.	Enlargement of abdomen; has been repeatedly tapped, and became so ill and emaciated that she was unable to walk.	No symptoms, even of a vague character, attributable to gallstones.	Convalescence entirely satisfactory except for bronchitis.
1074	43 years; single.	Empyema of gall-bladder; myoma uteri and cholelithiasis.	Cholecystectomy; appendicectomy; hysteromyomectomy.	Pressure symptoms from pelvic tumor.	For the past two or three years has had almost constant pain in the right hypochondrium, which has become more constant and severe of late, though unattended by any other symptoms; never any trace of jaundice; pain usually more pronounced after eating and just before and after menstrual periods; accompanied by constipation and distention.	Convalescence uneventful.
1105	30 years; married.	Suppurative appendicitis.	Appendicectomy; cholelithotomy.	Severe pain in right iliac fossa and across the lower part of abdomen; has had three such attacks in last four months.	For last five years patient has had severe attacks of pain in epigastrium accompanied by intense vomiting; these attacks only come on after eating some indigestible article of food; only for last four months they have been especially severe over McBurney's point; no jaundice.	Convalescence uninterrupted.

Case No.	Age, married or single.	Primary disease for which operation was performed.	Operation.	Symptoms attributable to primary disease.	Symptoms attributable to gallstones.	Result.
1152	39 years; married.	Retroflexio uteri.	Hysterosalpingo-oophorectomy; cholecystotomy.	Constant dragging sensation; of late has had attacks of vertigo; for a short time after first operation was slightly relieved, but soon suffered most agonizing pain at each menstrual period, and at other times severe abdominal pain which failed to localize definitely.	Previous to first operation there were no symptoms whatever referable to gallstones, neither were they suggested by symptoms previous to second operation, and at most only a very vague history of cholelithiasis could be elicited upon close inquiry after the second operation.	Convalescence uneventful.
1181	50 years; married.	Myoma uteri	Hysterosalpingo-oophorectomy; cholecystotomy.	For past three years has had backache, headache, severe metrorrhagia, and menorrhagia; has become so weak that cannot undergo any exertion without great fatigue.	Patient gives rather indefinite history, but so far as could be elicited there were no symptoms referable to gall-bladder; has been subject to indigestion for a year or more, but has had no pain in epigastrium, nor has been subject to nausea or vomiting.	Convalescence moderately satisfactory.
1197	28 years; married.	Appendicitis and cholelithiasis.	Appendicectomy; cholecystotomy; drainage of gall-bladder.	Several times pain in epigastrium has extended around right side to back and finally settled in region of appendix.	For the last twelve years patient has had severe indigestion, with eructation of gas, heavy feeling over pit of stomach, nausea, and vomiting; has had severe attacks of pain in the epigastrium especially; no jaundice.	Extremely nauseated for four or five days, after which convalescence very satisfactory.

RECORD OF CASES.

No. 1. *Multilocular ovarian cyst; cholelithiasis. Gynec. No.* 600.

In the following history unquestionable gallstone attacks antedated the appearance of the multilocular cyst. The attacks were so characteristic that her physician had made the diagnosis of gallstone colic a year before the operation was performed for the cyst. Notwithstanding these severe attacks of colic there has never been a well-defined history of jaundice.

Married woman, aged forty years. Has borne three children; oldest nineteen, youngest eleven years of age. Labors were difficult, but not attended by complications. Menstrual flow regular; not painful; lasting four days; profuse. With the exception of the usual diseases of childhood, she was well until one year ago, when she had an attack of severe epigastric colic, which her doctor said was due to gallstones. Since then she has suffered with two such attacks. There is an uncertain history of jaundice. Last attack occurred six months before admission to hospital, but was not accompanied by vomiting, though at these times there was slight diarrhea. Two months before admission to the hospital, the patient noticed a slight enlargement in the lower abdomen, which has rapidly increased in size until two weeks ago, when her doctor advised her to come to the hospital. There was no cough; no jaundice.

Examination. All of the cardinal signs of an ovarian cyst are elicited, both by bimanual examination and examination of the abdomen. The abdomen is distended to the size of a full-term pregnancy. No special tenderness over hypochondrium.

Operation. Cystectomy; cholecystotomy. An incision was made below the umbilicus, revealing a multilocular ovarian cyst which was removed without difficulty. On account of the history of epigastric colic, which antedated

the first appearance of the cyst, the gall-bladder was examined and found to be greatly distended, and filled with a large number of stones. With one hand in the abdomen the gall-bladder was pushed up against the ventral wall and a counter incision made over it. Four large stones, a centimeter in diameter and very closely resembling acorns, and sixteen smaller ones, were removed. The gall-bladder was closed with fine silk sutures and a small gauze tampon packed down to the point of suture.

Convalescence uneventful.

No. 2. Tubo-ovarian abscess; adherent vermiform appendix; cholelithiasis. Gynec. No. 898.

In this case the history reveals clear-cut symptoms of gallstone colic. That this preceded and was independent of the tubo-ovarian abscess there can be no question. In such a case the greatest care should be observed in the examination of the gall-bladder. In fact, it would be much better to examine and, if necessary, operate first upon the gall-bladder, than to let this follow the pelvic operation. When the course pursued in this case is followed, the pelvis should be filled with gauze, and a fresh pair of rubber gloves used, thus guarding against the distribution of possible infectious matter in the pelvis. In vague cases it would be better surgical judgment to omit the cyclic examination.

Married woman, aged thirty-six years. Has borne two children, the last twelve years ago. Labors easy. Patient first menstruated at fourteen years; flow has always been profuse; excessively painful at onset, but pain gradually subsides throughout the period; duration ten days. Considerable leucorrhea; sleeps poorly; has constant backache; suffers from almost constant indigestion and obstinate constipation. One year ago last February noticed a small mass about the size of a hen's egg in the lower abdomen, which was painful to the touch. This mass has grown slowly, and has become more painful; since it has been noticed it has caused no increase in the flow at periods,

although her menses have been four or five days too long for several years. She has never noticed any intermenstrual bleeding. Has more or less dragging pelvic pain; urination is painful, and especially noted after bladder is emptied. She has constant headache, is becoming very nervous, and is troubled with eructation of gas and pain over the stomach. One year ago last February the patient was suddenly seized with sharp pain in the abdomen, which began below the thorax on the right side and extended directly through the abdomen to the back. This pain was associated with nausea and vomiting and severe constipation. A few days later she became jaundiced. Since the first seizure the patient has had similar ones every two weeks; for a few days after each attack her stools are of a bluish color. While jaundiced the patient says she has noted that her urine is very dark in color.

Examination of the Urine. Amber; slightly clouded; heavy, white flocculent precipitate; specific gravity 1020; acid; no albumin; no sugar; test for bile negative; indican present. On microscopic examination it is found loaded with leukocytes; many flat and spindle-shaped epithelial cells; no casts.

Pelvic Examination. Pelvic floor normal; cervix normal; in the right pelvic quadrant a fluctuant mass, excessively tender to the touch, was felt. Uterus in retroflexion, adherent. Left tube and ovary apparently normal. Inspection of abdomen negative. On deep palpation she complains of considerable tenderness in the pelvis over both ovarian regions, but especially marked on the right side. Likewise there is marked tenderness and some rigidity over the right rectus muscle at the lower border of the thorax.

Operation. Left salpingo-oophorectomy; cholecystotomy (twelve gallstones removed). A central abdominal incision below the umbilicus was first made, revealing the uterus in adherent retroflexion. On the right side a tubo-ovarian abscess about the size of a small orange was found; the

left tube was inflamed, but as yet there was no occlusion. The right tube and ovary were cleanly enucleated with comparative ease. Although the left tube was considerably inflamed, it was thought best to leave it, in the hope that resolution would take place. At the completion of the pelvic operation the appendix was examined and found to be slightly adherent, and was therefore removed. On passing the freshly gloved hand up to the gall-bladder it was found to be adherent and enlarged and filled with several gall-stones. A counter incision was made over the gall-bladder, and it was drawn up out of the wound and incised; twelve gallstones were removed. As the mucous membrane appeared to be normal the gall-bladder was closed with fine silk intestinal sutures and dropped back into the abdomen without drainage.

With the exception of exaggerated nausea the patient reacted well, but complained of excessive pain in the region of the gall-bladder. On the fourth day she had a chill, with a sudden rise in temperature to 103.3°. The pain about the gall-bladder was severe, and there was considerable tenderness, with marked puffiness about the incision. Jaundice became marked. On the fifth day the symptoms were much less marked, the pain and tenderness likewise much less severe. On the seventh day the temperature reached the normal; all of the symptoms had disappeared, and the jaundice was clearing up. On the tenth day the patient felt quite well, and the central abdominal wound had entirely healed. There was, however, over the gall-bladder wound slight suppuration. The stitches were removed on the tenth day, and from this time on the patient had a normal convalescence, and was discharged on the twenty-third day in an excellent condition. Both wounds had healed perfectly and the jaundice had completely disappeared.

Note. In the postoperative review of this case, although the patient ultimately made a perfectly satisfactory recovery and left the hospital in the usual time, nevertheless the

sudden rise of temperature on the fifth day would seem to indicate that there was a damming up of the bile in the gall-bladder, with occlusion of the common duct, for in addition to the tenderness and pain, jaundice became a marked symptom. Had this persisted the gall-bladder incision would have been promptly opened and the gall-bladder drawn up into the incision and drained. As yet my opinion is not well defined as to the best course to pursue in these cases. On the whole, I believe one would less frequently err in stitching the gall-bladder to the abdominal incision and draining it than in closing it and dropping it back without draining; for in those cases where jaundice has been a symptom following gallstone attacks there is always a greater possibility of slight stricture of the common or cystic duct, and therefore the dangers of the rupture of the gall-bladder if not drained are increased.

No. 3. Double multilocular ovarian cysts; cholelithiasis. Gynec. No. 917.

In reviewing this case the details of the history previous to the patient's acute attack are not sufficient to throw any light upon whether the gall-bladder had played any significant part in her ill-health. Taking into consideration the fact, however, that she has been more or less wretched for several months previous to her entrance to the hospital, and that the cysts have only appeared comparatively recently, it would seem possible that the cholelithiasis has been a factor in her ill-health, for she very rapidly improved in her general condition after the operation, and is in much better health than she has been for several years.

Woman, aged sixty years. Married thirty-three years; no children and no miscarriage. Menstruated first at thirteen years; the flow was always scant, lasting three days, and was accompanied by considerable pain. Her menses ceased at thirty-two years, a rather unusually early time for a woman who has always had good health in her younger days. She was always well until the menopause,

but since then has never felt robust, and has had repeated attacks of weakness and run-down feeling, especially for the last few years. Last fall she ran into an open gate, striking the abdomen, which gave her great pain for several months. Three weeks ago she began to feel drowsy and dizzy, had no appetite, and became very weak. This condition persisted for about one week, when on rising one morning she fell to the floor, became temporarily blind, and was so dizzy that it was impossible for her to get up. Subsequent to this first attack she was put to bed and had daily attacks in which she had what she described as "convulsive pain." She had great difficulty in voiding urine, and on admission to the hospital was suffering from acute retention. No jaundice was present at this time.

Examination. Uterus small; pushed forward by a large multilocular cyst, filling Douglas' cul-de-sac and extending upward to a point midway between the symphysis pubis and the umbilicus. Above this point the abdominal walls are soft and relaxed, but very thick. Considerable tenderness over the right hypochondrium.

Operation. Hysterosalpingo-oophorectomy for multilocular papillomatous cyst of right side; cholelithotomy. The cyst was slightly adherent, but was not twisted, and there was no evidence of acute pathologic lesions to account for the peculiar symptoms from which the patient suffered a week previous to her admission to the hospital. The right cyst was much larger than the left, although the left had begun to show papillomatous change. The hysterosalpingo-oophorectomy was performed in the usual way and without special complications. As the patient had suffered considerably from pressure over the right hypochondrium the gall-bladder was examined and found greatly distended, with a large number of soft gallstones. A counter incision was made over the gall-bladder and this organ brought up and incised, when a large number of soft stones were removed. On account of the peculiar appearance of the debris and

the congested appearance of the mucous membrane of the gall-bladder, it was deemed wisest to drain it. Consequently a small gauze pack was inserted into its cavity. The time required for operating was one hour and twenty minutes. Subsequent to the operation nausea and vomiting persisted for several days, and was finally controlled by giving small doses of acetanilid. The abdomen became very tympanitic and the bowels were relieved with considerable difficulty. On the fifth day the gall-bladder drain was removed, followed by a flow of pure bile. From this time on the patient improved steadily. There was no pain referable to the pelvis, but at times the patient complained of pain over the gall-bladder wound. The biliary fistula rapidly contracted, and at the time of her discharge from the hospital, six weeks after operation, would barely admit a very fine probe, and was no longer discharging any bile.

The patient's general condition when she left the hospital was excellent. The wounds were well healed and strong, and all of the symptoms from which she was suffering when she entered the hospital were relieved.

No. 4. Relaxation of pelvic floor; bilateral laceration of cervix; erosion of cervix; small parovarian cyst; cholelithiasis. Gynec. No. 950.

In the following case it would, perhaps, be better to speak of the pelvic condition as being coincident with the cholelithiasis, for it will be seen from the history that the symptoms of the latter were much more pronounced, and were, therefore, the dominant features of the case. Nevertheless the continued ill-health of this patient dates back to the birth of her first child, showing that the laceration of the cervix and relaxation of the pelvic floor have played a very definite part in her ill-health.

Married woman, aged twenty-eight years; five children; one miscarriage. Labors were all difficult; instruments were used in birth of second child. At this time she sustained a considerable laceration. Menstrual flow first appeared

at fourteen years of age; it has always been profuse, very painful, and irregular in character. For the last two years she has had profuse leucorrheal discharge. Until her marriage, twelve years ago, she was very robust. Since the birth of her first child she has never been entirely well, but has suffered with dragging pains in the lower abdomen and small of the back, with attacks of severe frontal headache. Four years ago she was suddenly seized with a severe colic, centering below the border of the ribs in the right midclavicular area. The pain was transmitted up to the right shoulder, where it stopped. She was persistently nauseated, and vomiting became a very exaggerated symptom. The above attack lasted for twelve hours; it was not followed by jaundice, nor has she been jaundiced since that time. Tenderness was very marked below the right costal border. Since this time the patient has had recurring attacks similar to the above about every six or seven weeks. Each attack is longer in duration and more severe than the preceding one.

From the history it is evident that two sets of symptoms are paramount: First, those consisting of frequent and burning micturition, severe constipation, and constant dragging pains in the abdomen and small of the back, and more or less nervousness which may properly be attributed to some pelvic ailment. On the other hand, the second set of symptoms are distinctly referable to the biliary passages.

Examination. The patient is of slender build; no evidence of jaundice, except perhaps a slight sallowness of complexion, which, however, might come from her general debilitated condition.

Pelvic Examination. Marked relaxation of the pelvic floor, due to old lacerations in each vaginal sulcus. Extensive erosion of the cervix due to a bilateral laceration. Uterus in normal anteflexion, movable; no adhesions. On the right side there is a small cystic mass about the size of an orange. On inspection of the abdomen nothing significant is noted. Notwithstanding the repeated childbirths coming

close together, the tonicity of the abdominal muscles is good, and there is no tendency to a diastasis of the recti muscles. On deep palpation over the abdomen there are no areas of tenderness in the lower part, but from the xiphoid cartilage across the lower border of the last fixed rib there is marked tenderness and rigidity of the rectus muscle. Not only is there rigidity, but there is some tendency to nausea upon deep pressure. On account of the muscular resistance nothing can be definitely palpated. The liver dulness, however, on percussion is normal.

Operation. Dilatation and curettage; trachelorrhaphy; resection of relaxed vaginal outlet. At the completion of the plastic operation a longitudinal incision was made in the outer border of the right rectus muscle. Adhesions were at once encountered below the border of the liver and the transverse colon, which, however, were separated without difficulty, exposing the gall-bladder, which was small, atrophied, and situated deep under the liver. One stone was found at the junction of the cystic and common ducts, partially projecting from the former into the latter. On account of the difficulty of reaching the stone the gall-bladder was bisected down to the stricture, which grasped the stone; this was excised, permitting its removal. The gall-bladder was then amputated at this point and the stump stitched over. Before closing the wound the hand was passed down into the pelvic region, at which point a parovarian cyst about the size of an orange was felt. Fortunately it had a long pedicle, permitting it to be drawn up into the gall-bladder incision, at which point it was ligated and excised. This part of the operation was very simple and required but a few minutes. At its completion a gauze tampon was packed down upon the stump of the gall-bladder.

The patient made a satisfactory convalescence, her highest temperature being 101.2° on the third day and pulse 110. The first five days of her convalescence were marked by

undue nausea and vomiting, but this gradually subsided. Beyond a slight superficial suppuration of the abdominal incision at the point where the gauze was withdrawn, the healing of the wound was satisfactory. The patient was discharged, in a very good condition, on the twenty-first day after the operation.

No. 5. Retroflexio uteri; chronic suppurative appendicitis; parovarian cyst; choldithiasis. Gynec. No. 1055.

This case is an extremely interesting one from two standpoints. First, the patient had well-defined symptoms pointing to all of these conditions, but had drifted from one physician to another, all of whom had assumed that she was a purely neurotic individual. The case justifies the position that when a patient complains persistently of pain in a well-defined area it is always hazardous to ascribe it to hysteria or a neurotic condition. Second, the value of a complete exploration of the abdomen is likewise demonstrated, for here the major symptoms point to the pelvic organs, and had we been content to stop with the removal of the tumor without further inspection, two serious conditions, either one of which was much more grave than the pelvic condition, would have been overlooked, and sooner or later either one or both of them would have necessitated a second operation.

Single woman, aged thirty-five years. Menstrual flow appeared first at fourteen years of age; has always been irregular, usually under twenty-four days; sometimes occurring as often as every two weeks. Periods last three or four days as a rule, but of late the flow has at times been prolonged for four weeks. Family history negative. Usual diseases of childhood; considerable intestinal dyspepsia seven years ago; throughout the summer of 1902 she had continuous fever and chills, which were said to be due to malaria, but during this time she was almost continuously jaundiced. Last winter she had a violent fall, and since then has had more or less constant pain in the left ovarian

region, with backache and headache. These symptoms were present before the accident, but have been very greatly increased since then. The bowels are constipated, and evacuation is always attended with pain. Considerable irritability of the bladder. Appetite fair. Urine: very yellow; cloudy; white precipitate; no albumin; no sugar. The patient's symptoms in the past have been largely ascribed to nervousness. Upon close questioning, however, it is found that at present she complains of constant pain in the right side, which has been attributed by her physician to the vermiform appendix. Upon inspection of the abdomen marked pigmentation, due to repeated counter-irritation over the gall-bladder, is found. As the patient has applied these mustard draughts herself, it would seem that the supposition that the pain had come from the appendix is unfounded.

The uterus is found to be somewhat enlarged, markedly retroflexed, and anterior to it there is a small cystic tumor springing from the ovary. On deep pressure over the vermiform appendix the patient complains of pain, not, however, as much as is usual in acute or even chronic cases of appendicitis. The gall-bladder is enlarged, projecting three fingers' breadth below the rib, and is tender to pressure.

Operation. Cystectomy for parovarian cyst; appendicectomy; cholelithotomy; removal of a gallstone about the size of a small olive; suspensio uteri.

Upon making a central incision below the umbilicus the cystic tumor which had been diagnosed was found to be of parovarian origin and was about the size of a large lemon. The cyst was easily enucleated without interfering in any way with the ovary or tube. The vermiform appendix was found lying posterior to the cecum and adherent. Upon removal it was found to be chronically inflamed and contained about one-half drachm of pus. In order to explore the hepatic region the incision was sufficiently enlarged to

admit the hand. The gall-bladder was found distended but not adherent. It contained a gallstone about the size of a small olive, which was situated at the opening of the cystic duct, but could be pressed back into the gall-bladder. A very small counter incision was made over the gall-bladder. With the abdominal hand the gall-bladder was pushed up into the incision, where it was incised and the stone removed. As the mucous membrane appeared to be healthy the gall-bladder was closed with fine silk sutures and dropped back into the abdominal cavity. A small gauze tampon was introduced down to the site of the suture. Subsequent to the operation, the patient made a satisfactory recovery.

No. 6. *Myoma uteri; cholelithiasis. Gynec. No.* 1061.

In the following history a gallstone was found coincident with a myoma of the uterus; the latter condition, however, was the only one giving rise to any symptoms. Nothing in the history of the patient's condition pointed to the presence of the gallstone before operation.

Married woman, aged forty-three years. Has two children, last born nine years ago. Labors normal. . Previous to seven years ago the patient's menstrual flow was regular; since then it has been irregular and profuse, lasting eight days. Not painful. About three years ago the patient noticed an enlargement of the abdomen, which, however, at first gave her no uneasiness. For a time the tumor did not perceptibly increase in size, but of late it has taken on active growth. At present she has no symptoms further than heaviness in the lower abdomen. Menstruation has been as noted above, except for a period of three months, when the flow did not appear. Bowels constipated. No special irritation of the bladder. She has occasional, but not severe, headaches.

Examination. Pelvic floor normal; slight laceration of the cervix. The fundus uteri lies anterior to but is directly connected with a large globular solid tumor springing from its posterior wall, and markedly distending the abdomen

up to the umbilicus. The tumor is symmetric and is of about the size of a five months' pregnant uterus. In this case the indications for operation are the rapid growth of the tumor and the prolonged menstrual flow. On general palpation of the abdomen there is some muscular resistance and slight pain over the gall-bladder area.

Operation. Hysteromyomectomy; both ovaries left *in situ.* Cholecystotomy; a large stone about the size of an olive removed. A central incision of sufficient length to permit the delivery of the uterus upon the abdomen was made. There was an extraordinary similarity in the size and consistence of the uterus to a normal pregnancy, and had not the age and history of the case been entirely opposed to this diagnosis it would have made the differential diagnosis rather difficult. After the completion of the hysteromyomectomy the vermiform appendix was examined and found to be somewhat large, but not the seat of an acute inflammation. On further palpation of the abdominal organs a gallstone the size of an olive was felt in the gall-bladder. With one hand in the abdomen the gall-bladder was pushed up against the anterior abdominal wall, a small incision was made just below the rib, and the stone removed. The gall-bladder was then closed with fine silk sutures and dropped back into the abdominal cavity without drainage. On account of the extra time consumed in this operation the appendix was not removed, as it appeared to be normal. Convalescence was uncomplicated until the tenth day, when she began to have irregular temperature, followed a few days later by a discharge of pus from the cervical stump. Subsequent to this she made a satisfactory recovery.

NOTE. In this case there is no history of indisposition pointing to the gall-bladder. In other words, this would appear to be a case of cholelithiasis unaccompanied by any symptoms, and as it was a single large stone subsequent complications from its presence would not likely have occurred.

No. 7. Retroflexio uteri; relaxation of pelvic floor; cholelithiasis. Gynec. No. 1069.

In this case, notwithstanding the fact that the patient is very neurotic, two sets of symptoms are prominent: first, those referable to the epigastric area and suggestive of gallstones, although the usual clinical symptoms are absent; second, those attributable to the retroflexion of the uterus.

Married woman, aged thirty-eight years. She has borne nine full-term children; first four labors easy; last five very painful and difficult. None of them were instrumental deliveries. Family history negative. Her present trouble began while carrying her seventh child, during which time she had irregular uterine hemorrhages, which at times became very free. This continued until the sixth month, when a miscarriage occurred. In her two succeeding pregnancies there was the same irregular flow, but the children were born at full term. Her miscarriage occurred nine years ago, and her last full-term child was born two years ago. At present her chief complaints are severe pain in the epigastric region, especially marked over the lower region of the liver and gall-bladder; a second point at which she complains of pain is directly over the symphysis pubis. Her appetite is variable, and she has steadily been losing weight. Her menstrual periods are regular but profuse; not especially painful. Patient suffers considerable with frontal headache; bowels are markedly constipated, but there are no symptoms referable to the bladder.

The patient is very thin and emaciated. While she is of the neurotic type, complaining of a great many ills, her chief symptoms are unquestionably referable to the epigastric and suprapubic areas.

Pelvic Examination. Uterus enlarged; acutely retroflexed but not adherent. The external os uteri is patulous, due to a slight laceration of the cervix. On palpation of the abdomen there is no complaint of pain until the epigastrium is reached, where there is considerable tenderness, especially

over the gall-bladder. At this point there is a considerable mass which it is difficult to differentiate from a movable kidney. Here the skin is pigmented, from repeated applications of counterirritants made by the patient herself.

Operation. Intraperitoneal shortening of round ligaments; cholecystectomy. After the patient was anesthetized the palpable mass in the right hypochondrium could be differentiated from the kidney, thus establishing the diagnosis of dilated gall-bladder, probably due to obstruction from gall-stones. There was considerable diastasis of the recti muscles, arising from repeated and rapid childbearing.

An incision was made in the central line of sufficient size to permit the introduction of the hand. The diagnosis of the pelvic condition was verified. The vermiform appendix was found to be pulled backward underneath the cecum, and slightly kinked, but not acutely diseased. The gall-bladder was greatly distended, and at its junction with the common duct a stone of about the size of the tip of the little finger was felt. A counter incision was made over the gall-bladder and it was drawn up into the incision and opened. Eight ounces of clear mucoid fluid escaped, but there was no trace of bile, showing that the gall-bladder had been occluded for a considerable time. After evacuation of the mucus a mulberry stone about the size of the tip of the index finger was removed. Upon deeper palpation of the cystic duct underneath the liver another stone was felt blocking the exit of the cystic duct. This stone was incarcerated by an hour-glass constriction, and could not be pushed back into the larger part of the gall-bladder. An attempt was made to dilate the stricture, but this likewise failed. The gall-bladder was then bisected down to the point of stricture, permitting the easy delivery of the stone. The lining membrane of the gall-bladder was atrophied, and the gall-bladder was therefore amputated at the point of the stricture. The stump was securely closed with catgut sutures and dropped back without drainage. At the

completion of this operation the uterus was brought up and suspended by shortening the round ligaments and stitching them to the fundus uteri. No attempt was made to remove the vermiform appendix, for it was considered wiser not to prolong the operation in this way on account of the necessity for the repair of the pelvic floor. After the closure of the abdomen an Emmet operation was performed. Notwithstanding the diastasis of the recti muscles, the stomach, transverse colon, and sigmoid flexure were in normal position.

Note. In this case the interesting questions are: How much the distended gall-bladder and encysted stones and how much the retroversion of the uterus contributed toward the patient's ill-health? In view of the fact that there were two well-defined sets of symptoms, one pointing to the epigastric area and the other to the pelvis, it would seem that each was a separate and contributing factor.

No. 8. Multilocular ovarian cyst; ascites; cholelithiasis. Gynec. No. 1071.

In this case there was no symptom, even of a vague character, attributable to the gallstone, and had it not been necessary to make the counter incision below the ensiform cartilage to control the oozing in the anterior abdominal wall, the gallstone, had it been discovered, would probably not have been removed. In view, however, of the fact that she was in excellent condition and the removal of the stone did not require more than five minutes, I felt that this procedure was entirely justifiable.

Married woman, aged forty-five years. Has had one full-term child and three miscarriages. The miscarriages occurred before her full-term child was born. The labors were not difficult, and in none were instruments required. The patient began to menstruate at thirteen years of age; the flow was regular up to the time of the menopause, which occurred five years ago. Family history negative. Excluding the present condition, the patient always had good health from childhood. The menopause occurred in her fortieth

year. She was well until three years ago, when she began to have rather free leucorrhea, which at times became blood-tinged; she, however, suffered from no discomforts whatever. About this time the abdomen began to enlarge, and she consulted a physician, who thought she was again pregnant. She consulted another one, who gave local treatment, but without any benefit. A third doctor was consulted, and by this time the abdomen had reached a considerable size. She then noted that the abdomen decreased in size, but within six months was again rapidly enlarging. For the last two years she has been repeatedly tapped, and has at last become so ill and emaciated that she is unable to walk about. At each tapping from one to three bucketfuls of fluid were removed. During this time the several physicians who had seen her thought she had ascites. The fourth physician, however, suspected that she had an ovarian cyst, and insisted upon her going to the hospital.

Examination upon Admission to Hospital. Vaginal outlet normal; cervix normal; uterus small, pushed backward into Douglas' cul-de-sac by a lobulated cystic tumor which extends upward into the abdomen as high as the ensiform cartilage. The abdomen is greatly distended, although she has been recently tapped, being about the size of a full-term pregnancy. The superficial veins of the abdomen are enlarged and prominent, and at several places in the lower abdomen there are scars representing previous tappings of the cystic tumor. In addition to the ordinary physical signs of a multilocular ovarian tumor there are also characteristic signs of ascites in each loin.

Operation. Cystectomy; cholelithotomy. An incision in the lower abdomen revealed a large multilocular ovarian cyst which was adherent to the transverse colon and to the abdominal wall at various parts where the tumor had been tapped. The adhesions were especially dense just below the ensiform cartilage, and rather free oozing occurred after the release of the cyst. As the result of pressure upon the

right side the ureter was considerably distended, but, as soon as the cyst was removed, tended to evacuate itself naturally. Upon examination of the gall-bladder a stone of considerable size was discovered. A counter incision was made below the ensiform cartilage in order to reach the oozing points, which were ligated. A very small incision was made into the gall-bladder and a stone about the size of an olive removed.

Subsequent to the operation the patient suffered considerably from bronchitis, which caused distress on account of coughing, but this subsided, and otherwise her convalescence was entirely satisfactory. On the fifth day after the operation she suffered with retention of the urine, with overflow. This required irrigation of the bladder for several days subsequent to the operation, but the urine cleared up, and at the time of her discharge from the hospital, twenty-five days after the operation, she had no further vesical disturbances. Both wounds healed *per primam.*

No. 9. *Empyema of the gall-bladder; cholelithiasis; myoma uteri. Gynec. No.* 1074.

This case is particularly interesting for there is an associated relationship between the menstrual symptoms, which for the last four or five years have been prominent, and the gastric attacks which have occurred especially within the last two years. As will be noted in the history, the patient complained of her digestive disturbances more especially just before and after the menstrual periods. Notwithstanding the empyema of the gall-bladder, her temperature and pulse were normal at the time she entered the hospital. In this case, outside of the menstrual disturbances, her pains very closely simulated those coming from simple digestive disturbances, excepting the last severe attack, which occurred in Canada and confined her to the hospital for a month.

In this case, the history combined with the examination rendered the diagnosis of cholelithiasis and myoma uteri

positive. The history pointed to the gall-bladder area as being the seat of the more serious lesion.

Single woman, aged forty-three years. Patient menstruated first at fifteen years of age; character of flow, especially in recent years, has been very profuse, but has been regular, lasting five or six days. Six months ago she was examined under anesthesia by her home physician and a fibroid tumor the size of a grape-fruit discovered. On account of the excessive menstrual flow a curettage was performed; the endometrium, however, was not excessive or redundant in character. Subsequent to this operation the menstrual flow was much less free. She never suffered with leucorrhea. For the past two or three years she has had almost constant pain in the right hypochondrium, which has lately become more constant and severe, though unattended by any other symptoms. There was never any jaundice. The pain in the hypochondrium and over the pit of the stomach was usually noted after eating and just before and after her menstrual periods. While away during the summer months in Canada she had a severe attack marked by excessive constipation and tympanites. It was so severe that she was compelled to go to a local hospital, where she was confined to bed for four weeks. This attack followed immediately after a menstrual period, but there was not the slightest trace of accompanying jaundice. At the end of four weeks she returned home, but has had almost continuous pain in the hepatic region, which has been more or less of a constant sickening, aching character. In the mean time she has suffered to a more or less extent from pressure symptoms from the pelvic tumor. She has always had severe pain just before and for the first two days of the menstrual periods, but has looked upon this as the usual menstrual cramp. For the last few years this has been much more severe, and for some time she has been compelled to go to bed at each period and remain for perhaps a week.

Examination. Vaginal outlet normal; cervix normal; uterus in anteposition, enlarged to the size of a grape-fruit, and pushed over to the left. The patient has rather thick abdominal walls, making an accurate examination of the ovaries and tubes impossible. Upon inspection of the abdomen nothing abnormal was noted. Upon palpation, however, a considerable mass was felt in the right side just below the last permanent rib.

Operation. Cholecystectomy; appendicectomy; hysteromyomectomy. From the history of the case it was evident that the patient was suffering from two distinct sets of symptoms: first, those incident to the fibroid tumor, and, second, the group of symptoms focusing about the gall-bladder. Notwithstanding the extensive empyema of the gall-bladder, jaundice had persistently been absent. An incision was made in the median line, below the umbilicus, revealing a fibroid tumor about the size of a grape-fruit. It was quite movable and not adherent. Before considering any operative treatment of the fibroid a cyclic examination of the abdomen was made. The vermiform appendix was found lying underneath the cecum and pointing backward toward the kidney. It was partially enveloped by its mesentery and was retroperitoneal in its location. The gall-bladder was next palpated and found to be the size of a large pear, of very boggy consistence, but no gallstones could be felt. Light adhesions between the gall-bladder and the colon were discovered, but were easily broken up by the examining hand. The gall-bladder was quite large, dropping down to a point within two inches above and to the right of the umbilicus. With the two operative conditions before us the disease of the gall-bladder was considered the major one, and, therefore, was operated upon first. The right hand was introduced into the abdomen through the central incision, the adhesions around the gall-bladder were broken up, and it was pushed up against the anterior abdominal wall, and a short incision following the border of the lowest

fixed rib was made. Gauze packing was then placed securely around the gall-bladder, through the upper incision, completely walling it off from the general peritoneal cavity. The central incision was covered over with gauze, and thus temporarily sealed until the completion of the cholecystectomy. The gall-bladder was pulled well up and out of the incision and incised at the apex, evacuating about one pint of malodorous pus. The mucous membrane of the gall-bladder was entirely destroyed, leaving the muscular layer exposed as a dull-red surface. After evacuating the pus the gall-bladder was thoroughly flushed out with normal salt solution, the index finger was introduced, and a large faceted gallstone about the size of a small olive removed. This was grasped in an hour-glass sacculation. By further search another stone of smaller size was found and removed. After this, careful palpation both inside and outside of the gall-bladder revealed no more stones. On account of the extensive empyema of the gall-bladder its extirpation was considered advisable. It was bisected down to the point of the hour-glass sacculation, where it was amputated. The stump was closed by interrupted catgut sutures. That portion of the gall-bladder which was adherent to the liver was peeled off, leaving a slightly raw, oozing surface, which, however, was easily controlled by fine catgut sutures. A gauze tampon was packed down upon the stump and the incision was closed snugly around the gauze. At the completion of this operation the patient was in excellent condition and the hysteromyomectomy was next performed in the usual way. Both ovaries and tubes were dissected off from the tumor, leaving them intact. At the completion of the hysteromyomectomy the ovaries were sutured to the stump and the latter was drawn up into a snug position in the pelvis by its attachment to the round ligaments. This operation did not require an excessive length of time, and as the appendix, although not actually inflamed, was suspected by her physician of having given trouble, it was removed. The

combined operations required two hours for their completion.

The patient suffered from almost no shock, her pulse at the completion of the operation being 120. Her reaction was prompt, although she suffered excessively with nausea and vomiting. At the end of five days the gauze drain was removed; and at the end of ten the sutures were removed and primary union was found in both wounds. The patient at this time was very comfortable, her nervousness, which had been a prominent symptom during her convalescence, having largely disappeared. She was discharged from the hospital one month from the time of her operation. Her highest temperature and pulse after the operation were respectively 100° and 114.

No. 10. *Chronic recurrent suppurative appendicitis; cholelithiasis. Gynec. No.* 1105.

In this case there can be little doubt that the early symptoms from which this patient complained were due to acute gallstone colic. Later the appendicitis occurred, and at the time of the operation, on account of the acute tenderness and muscle spasm over the appendix, the history of gallstones was temporarily obscured.

Married woman, aged thirty years. Has borne one child; no miscarriage. Nothing significant in the puerperal history. Menstrual flow normal, lasting from four to seven days; not as a rule accompanied by pain. For the last five years the patient has had severe attacks of pain in the epigastrium, accompanied by intense vomiting, which has confined her to bed for two days. These attacks only came on when the patient ate some indigestible article of food. Recently it has been especially severe over McBurney's point. Four months previous to operation she had her first attack of general abdominal pain, which in a day or two focused in the right iliac region. At the beginning of this attack she was nauseated and vomited. She was in bed four days. The next attack was about eight weeks ago and was much

worse than the previous one. At this time she complained of severe pain in the right iliac fossa and across the lower part of the abdomen. She was confined to bed for a week. For the last few months she has been much more constipated than usual, although this has always been her habit. The last attack occurred five days before her entrance to the hospital, but was not so severe as the first two. She has been losing weight, is subject to palpitation of the heart, and has had constant indigestion. At no time has there been any history of jaundice.

Upon examination without anesthesia a definite enlargement could be made out in the region of the gall-bladder. There was likewise considerable pain and muscle spasm over the gall-bladder, which led to the conclusion that in addition to the pain which had arisen from the appendix or tube, the gall-bladder was also the seat of gallstones. In view of the fact that the patient had at no time been jaundiced, her physician looked with some skepticism upon the second diagnosis.

On examination under anesthesia the ovaries and tubes were found to be normal, which left the diagnosis of appendicitis paramount, with a strong secondary probability of gallstones. An incision was made over the appendix and the tube and ovary of the right side brought up and inspected, and were found to be normal. Next the appendix was located with some little difficulty, as it was situated underneath the cecum and was densely adherent. It was unusually long and extended up behind the cecum toward the kidney. The appendix was clamped at its cecal end and excised in the usual way. After the completion of this operation the gall-bladder was palpated through the appendical incision, and found to be so tensely distended that it hardly seemed possible that it could withstand so much pressure without rupture. It was enlarged to the size of a large Bartlett pear, and upon pressure the contents could not be squeezed into the duodenum. Although it was intensely distended,

evidently due to obstruction of the cystic duct, gallstones could not be felt, nor was there any crepitation suggesting their presence. A small counter incision one and one-half inches in length was made over the gall-bladder, and it was pushed up into view, lightly clamped, and an incision made into it. A half-pint of clear mucus escaped, without any trace of bile. Upon collapse of the organ the index finger was inserted and a number of gallstones located; with the aid of the gallstone forceps, ten stones of varying size were removed. Four were as large as the tip of the index finger; one had a peculiar, snout-like projection which accurately fitted into the cystic duct, producing complete obstruction. The mucous membrane of the gall-bladder was not diseased. The incision in the gall-bladder was closed by a Lembert suture; it was then lightly stitched to the peritoneum and a gauze pack inserted down to the point of suture. Subsequent to this operation the appendix was split open and found to contain one-half drachm of fetid pus.

The convalescence of the patient was uninterrupted.

No. 11. *Retroflexio uteri; atrophied appendix; cholelithiasis. Gynec. No.* 1152.

In this case the symptoms were entirely referable to the pelvic organs, consequently the first operation was a combined one, the uterus being suspended and an Emmet operation performed. Notwithstanding these operations the patient was at most relieved but a very short time, and continued to suffer so intensely that she was almost completely invalided. She returned two years subsequently, with the urgent request from her physician, seconded by her own wishes, that the ovaries be removed in order to stop the menstruation, for her exaggerated symptoms were all grouped around the periods. The gallstones which were discovered at the second operation were not suggested by the symptoms, and at most only a very vague history of cholelithiasis could be elicited upon close inquiry after the second operation.

Married woman, aged forty-one years; one child; no

miscarriage. The chief complaints of the patient are constant dragging sensations, especially when on her feet; backache, much worse at end of day; of late has had attacks of vertigo, followed by severe headaches and pain in the lower part of the abdomen, especially in the right ovarian region. This pain may come on at any time. Menstrual flow regular, lasting two days; very painful. All of her other symptoms are exaggerated at this time.

Examination. Pelvic floor markedly relaxed; uterus in acute retroflexion; both ovaries and tubes prolapsed, lying posterior to the uterus. When the patient was first seen her pelvic symptoms were all exaggerated. A simple suspension of the uterus was done, and the relaxation of the pelvic floor was corrected by an Emmet operation. On account of the smallness of the abdominal incision no general examination of the other abdominal organs was made.

She says that for a short time after this operation she was slightly relieved, but soon again suffered with the most agonizing pain at every menstrual period, and at other times had severe abdominal pain which, however, she failed definitely to localize. These symptoms have persisted for two years, and she has returned to the hospital willing to have anything done which promises relief. Upon second examination the uterus was found to be in anteposition, slightly enlarged, very hard, and the tubes and ovaries quite tender. In view of the fact that her health has been steadily growing worse and that she has almost become a permanent invalid, a more radical operation was determined upon in order to stop the menstrual flow.

Operation. Hysterosalpingo-oophorectomy; cholecystotomy. On making the central incision the uterus was found in midposition between anteflexion and retroflexion, with a long adventitious suspension band running from the anterior abdominal wall to the uterus. The ovaries and tubes, while not adherent, were prolapsed, somewhat

enlarged, but otherwise appeared to be healthy. As the patient was forty-one years of age, and as her menstrual periods were the chief source of her illness, being so severe that she was compelled to go to bed for at least ten days each month, the uterus, tubes, and ovaries were removed. The appendix was removed in the usual way; it was found to be small and partially atrophied. The gall-bladder was considerably enlarged, rather tense, and contained a number of gallstones. A small counter incision was made over this organ, through which it was delivered. A small incision was made into it, and twelve faceted stones, ranging in size from a small shot to the tip of the little finger, were removed. After extracting these stones the incision in the gall-bladder was closed by fine intestinal sutures. As the gall-bladder was perfectly healthy in appearance it was dropped back into the abdominal cavity and the abdominal wound was closed without drainage. The central abdominal wound was closed in the usual way.

Note. Subsequent to the second operation, upon closely questioning the patient referable to symptoms which might be attributable to the gall-bladder, she says that many times the pain would come on in the upper part of the abdomen, but would quickly become general, and was oftentimes attended with so much nausea and vomiting that she and her physician attributed it solely to reflex causes, especially in view of the fact that it was much more likely to occur about the time of the menstrual period. Notwithstanding this later note on the history it would seem that the symptoms in this case were much more prominently referable to the pelvic organs than to the gall-bladder. It has been three months since the last operation, and the patient says she is now very much more comfortable than she has been at any time for the last three years. She has no pain whatever, and her only complaints at present are vertigo and attacks of headaches, which, however, are not so severe as before her operation.

No. 12. *Myoma uteri; cholelithiasis. Gynec. No.* 1181. In this case if there were any symptoms arising from the gallstones they were merely those which have been attributed to gastric disturbances. At times the patient has suffered with what she calls attacks of indigestion, which have been considered by her physician as either reflex from the tumor or due to a simple functional dyspepsia. There have certainly been none of the classic symptoms of gallstones.

Married woman, aged fifty years; two children; no miscarriages. Labors difficult but not instrumental. Menstrual flow has always been profuse; duration usually about five days. Suffers no pain, but slight headache. Slight leucorrhea for several years. Family history negative. For the past three years she has been troubled with backache, headache, severe metrorrhagia and menorrhagia. Uterine hemorrhages may come on at any time, lasting from six days to two weeks. As the result of this continuous drain she has been steadily growing weaker, and is now unable to walk or undergo any exertion without great fatigue. For a year or more she has had dull aching pain at the base of the left thorax; for more than a year she has had incontinence of urine. The patient does not give a very definite history, but so far as the symptoms which could be elicited are concerned, none are referable to the kidneys, appendix, or gall-bladder. She has been subject to indigestion for a year or more, but has neither had pain in the epigastrium nor has been subject to nausea or vomiting.

Examination. Uterus found to be enlarged to the size of a four months' pregnancy, is nodular, and closely molded into the pelvis, but can easily be pushed up into the abdominal cavity. There is tenderness over the epigastrium, but not sufficient to direct especial attention to the gall-bladder.

Operation. Hysterosalpingo-oophorectomy; cholecystotomy; removal of one hundred and seventeen gallstones.

Diagnosis. Cholelithiasis; myoma uteri. The removal of the fibroid tumor was unaccompanied by complications and

was completed in thirty minutes. At the termination of this operation the usual routine examination of the abdomen was made. The vermiform appendix was found to be rather elongated, extending up posterior to the cecum. Upon examination of the gall-bladder it was found to be greatly distended by a large number of gallstones. This condition probably explains the persistent attacks of indigestion of which the patient has complained. The gall-bladder was pushed up with the abdominal hand against the anterior abdominal wall and exposed by a small incision. It was then tightly clamped at its dome and pulled up into the abdominal incision and opened. With one hand in the abdominal cavity the gall-bladder could easily be palpated against the liver, and by this means one hundred and seventeen gallstones were expressed which varied in size from that of a pea to the tip of the little finger. These had evidently been present for years, for they were closely crowded together and faceted. After the removal of the gallstones the gall-bladder was found to be practically normal, and, as the bile poured out easily through the cystic duct, it was deemed wisest to close it in the usual way. It was then dropped back into the peritoneal cavity and the incision closed without drainage. As the operation had been somewhat prolonged it was deemed wisest not to touch the appendix, which is likely to undergo atrophy in a woman of this age. Convalescence moderately satisfactory.

Note. Subsequent to the operation the patient, instead of having an incontinence of urine, as was the case before the removal of the tumor, suffered with retention, requiring continuous catheterizations for ten days. At times she also complained of considerable pain over the gall-bladder, which however, gradually subsided. Notwithstanding these complications there was marked improvement in her general condition, and on the sixteenth day after the operation she had become quite comfortable, and was discharged from the hospital on the twenty-third day feeling very well.

No. 13. *Recurrent appendicitis: cholelithiasis: pancreatitis. Gynec. No.* 1197.

Although this patient had had recurrent appendicitis, nevertheless the symptoms of cholelithiasis, followed later by those of pancreatitis, were dominant.

Married woman, aged twenty-eight years; has borne one child seven and one-half years ago; labor was normal, and with the exception of a slight laceration, which was immediately repaired, there were no puerperal complications. Menstrual flow occurred first at thirteen years of age, and has always been free; it has been regular for the last three months, but before that time she had intervals of six to eight weeks in which there was no flow. Periods last from four to five days; painful for first few days. Family history negative. At the age of sixteen the patient had an attack of what was called peritonitis, characterized by abdominal pain, which lasted for one month. Before and since that time she has had severe indigestion, with eructations of gas, heavy feeling over the pit of the stomach, nausea, and vomiting. In the latter part of last summer she had a slight aching pain in the right ovarian region. One month later she was seized early one morning with a severe pain in the epigastrium, which became markedly swollen. Had severe nausea, and vomited large quantities of bile. Later the pain extended around the right side to the back, and finally settled in the region of the appendix. Late in the afternoon, after a thorough evacuation of the bowels the pain ceased, but the soreness continued for several weeks over McBurney's point. There was at no time jaundice. The stools were dark in color, at times containing green mucus. She does not recall anything peculiar about the urine. The second attack occurred one month later, when she again had severe pain and soreness throughout the entire abdomen, but this time more marked in the epigastrium. This attack was attended by a very active painful peristalsis. From this time on the patient has steadily lost weight. She

has been unable to eat without severe indigestion, characterized by accumulations of gas, requiring violent kneading to relieve it. Over the line of the transverse colon she says it feels as sore as a boil. During this time she was on a very carefully selected diet, but nevertheless had another attack of severe pain, accompanied by severe emesis. After vomiting she always feels as though something were pulling the stomach back to the spine, and after each attack she passes large strings of mucus. During the last attack she voided no urine, but with its cessation large quantities were excreted. Her weight has dropped from 155 to 133 pounds in four months. Notwithstanding the general digestive disturbances her bowels have been regular. About this time the patient was seen by Dr. John H. Musser, who offered the opinion that she was suffering with recurrent appendicitis and cholelithiasis. As she had lost weight so rapidly he considered it likely that she was suffering with pancreatitis secondary to the cholelithiasis. The subsequent notes on the case establish the correctness of his diagnosis.

Upon examination of the pelvic organs nothing abnormal was discovered, the uterus being in normal position and the ovaries not palpably diseased. A little below McBurney's point, however, there was a tender area with some muscular resistance. The entire abdomen was hypersensitive but not especially marked over the gall-bladder area.

Operation. Appendicectomy; cholecystostomy; drainage of the gall-bladder. An incision was first made over the vermiform appendix, which was found to be obliterated in its lower end, while the portion next the cecum was chronically inflamed. It was removed in the usual way. Upon passing the hand upward to the gall-bladder it was found to be enlarged, and filled with innumerable small stones, giving it the feeling of a loosely distended sand-bag. No large stones could be felt. There were no adhesions around the gall-bladder, and upon palpation over the area of the pancreas nothing abnormal could be felt. In view of the fact that

the patient had lost weight there was a strong probability of her being the subject of a chronic pancreatitis. A counter incision was made over the gall-bladder; it was brought up into the wound, stitched to the peritoneum, and then incised, evacuating considerably more than a hundred small mulberry-looking stones, none of which were larger than a grain of wheat. The gall-bladder was drained.

Subsequent to the operation the patient was extremely nauseated for four or five days, after which she became quite comfortable and made an uninterrupted convalescence. All gastric disturbances disappeared, as did also the extreme tenderness in the neighborhood of the transverse colon. At the end of ten days the biliary fistula was allowed to close. During the four weeks the patient was in the hospital she gained weight and her appetite became normal.

Note. In this case, as one views the history, the symptoms of cholelithiasis are prominent, although the appearance of the appendix demonstrated beyond a doubt that the patient had also had recurrent attacks of appendicitis. On account of the rapid emaciation of the patient and her comparatively rapid recovery after the draining of the gall-bladder, there is little question but that she had pancreatitis, which was quickly relieved by the gall-bladder drainage.

DISCUSSION.

Dr. R. Stansbury Sutton.—I have been very much interested in Dr. Clark's paper. The presence of gallstones, as we are all aware, is quite common. That they do not always produce symptoms which justify resort to surgical operation is well known. Occasionally the difficulties arising from illness due to gallstones are very great and demand relief either by surgical interference or more slowly through medical means. Therefore, the subject is an important one.

With reference to the pathology of gallstones, I have no definite settled view, but I must take very grave exception to the views

expressed in the paper in regard to their origin from bacteria. As well might we say that a stone in the bladder had its origin in the same way. If you bisect a stone from the bladder you may find in the center of it a foreign body around which the salts of which the stone is composed are accumulated, and you do not say anything about bacteria. These gallstones are made up principally of cholesterin; the crystals of cholesterin form a nucleus for the formation of the gallstone. The streptococcus, the staphylococcus, is not a nucleus for gallstones, nor the colon bacillus. I take it, again, that where there is inflammation of the gall-bladder or of the duct we may have a stone deposited more surely than where there is not an inflammation; but there are cases in which bacteria have nothing to do with the formation of a gallstone.

With reference to the question of universal operation for gallstones, I believe that if a gallstone or gallstones are encountered in the course of another operation they had better be removed; but there is a remedy in use, and it has had its birth near the city of Boston, for the treatment of gallstones which will reduce the necessity of surgical interference fully 90 per cent. I cannot give you the chemical formula for it, but it is known as colalin. I have used it in several cases of gallstones where I had held operation in abeyance, and I have not had occasion to operate on those patients. If one can get a solvent for the cholesterin it is the secret of success for the medical treatment of gallstones, and I believe that remedy exists in colalin.

Dr. George M. Edebohls.—I question the necessity of operating for the removal of gallstones in every case in which gallstones are found associated when we operate for other conditions. In this connection I recall an experience which is quite unique so far as conversation with members of the profession, and my reading enables me to judge.

I had occasion some years ago to operate on a woman who presented decided dyspeptic symptoms. She had a movable kidney, chronic appendicitis, and an induration in the region of the gall-bladder. I anchored the movable kidney; removed the appendix through the lumbar incision, delivered the gall-bladder into the lumbar wound, and found that it contained a large stone, 4 to 5 cm. in length, pear-shaped, and nearly filling the gall-bladder. The attending physician was positive that

the gall-bladder was not responsible for any of his patient's symptoms and would not agree to the removal of the stone. A year later I had occasion to open the abdomen of this patient a second time for some other reason, and availed myself of the opportunity to again examine the gall-bladder, which was now found perfectly healthy and empty. The large stone had either passed or had been dissolved. The treatment after the first operation had consisted of nothing but olive oil administered for about a month, and whether that had anything to do with causing the disappearance of the gallstone I do not know. At any rate, there was no trace left of its former existence.

As to the method of operating Dr. Clark has told us that he prefers the method of Kelly, who introduces the hand through the incision in the lower abdomen, explores the gall-bladder digitally, then makes a second small incision higher up and drags the gall-bladder into that incision. That sounds rather nice and easy, but if any of you should attempt to drag out the gall-bladder through a small incision, you may find that that part of the program will not work. I do not believe anyone can deal satisfactorily with a diseased gall-bladder through the small incision mentioned. I would therefore caution against accepting this part of Dr. Clark's paper in the sense that the additional gall-bladder operation would generally be an easy matter. If you have a simple pelvic operation, and choose to attack the gall-bladder immediately afterward, do so. But if you have had a long and trying pelvic operation and the gall-bladder cannot be readily reached near the surface, I would advise postponing the gall-bladder operation to another occasion.

Dr. A. Palmer Dudley.—I want to say this: that I think we have got to look beyond the gall-bladder for this form of surgery. Surgery of the liver is in its infancy, in its swaddling clothes, so to speak, and I think I am able to cite cases that will prove that statement to be true. In a hospital with which I am connected I get everything that comes along, and I have had quite an experience with liver and gall-bladder disease. I believe we have got to go beyond the gall-bladder in looking for gallstones, and that in some cases they are found in the liver ducts. I can prove this by the history of more than one case. In one case in particular there was a discharge of gallstones numbering four hundred, which I am perfectly sure that the

gall-bladder could not have held, and I believe these stones are formed in the liver ducts themselves from stagnation of circulation, the formation of cholesterin nuclei, and that only a small proportion of the stones that we find in the gall-bladder are really what we should look for. I make bold to state that I do not hesitate to go into the center of the liver in exploring for gallstones. The last case I had was one in which a diagnosis was made of gallstones by my medical confrère, and I boldly went into the gall-bladder, but found no stones. I found the duct dilated. I went five inches into the right lobe of the liver, as far as I could reach with my finger, pressing back the abdominal wall, and packed the liver full with iodoform gauze, put an apron of gauze over it, subsequently removed the gauze, and the patient is well to-day. I believe it is good practice to invade the center of the liver for the purpose of looking for deposits of this nature. Not to take up too much time, I will simply say that we are looking at a well which is the reservoir for that which is formed higher up in the stream, and I believe with Dr. Clark that these formations, whether they are septic or not, should be removed, I am inclined, however, to disagree with him so far as bacterial formation is concerned ; nevertheless, we can do liver surgery that is not yet dreamed of; I am quite sure of it.

Dr. Brooks H. Wells.—I was much interested in a recent paper of Dr. Clark which was published in the *American Journal of Obstetrics and Diseases of Women and Children*, May, 1904, because it has happened during the last three years that I have used practically the same measures in the cases that have come under my observation, and in the course of that time I have found a number in which the patients complained of obscure symptoms supposed to be due to so-called functional indigestion. In these we found various diseased conditions of the biliary tract. By making a small or large incision, in accordance with the indications in each case, cleaning the bile passages and draining, remarkable relief has been obtained from symptoms which were supposed to be due to functional indigestion. All of us should make a routine examination of the entire contents of the abdomen whenever this can be done without seriously imperilling a patient's recovery, and I believe it can be done in the great majority of cases.

Dr. Seth C. Gordon.—I have now five cases under treatment in which I have recently opened the gall-bladder. In one there were gallstones, in another the gall-bladder was full of pus, and in the others it was filled with infected bile. In all of these cases where the abdominal cavity is opened for other purposes and one is quite sure the patient is able to stand the operation, I should examine the gall-bladder thoroughly, and if I found stones I would remove them.

The fad now is to wash out everybody's stomach, and stomach men are getting to be as abundant as gynecologists all over the country. Every young man who has nothing else to do makes a specialty now of stomach ailments. He is washing out every stomach he can, whether he has seen it done or not. While there may be a great deal of trouble referred to so-called indigestion, both stomachic and intestinal, I believe a great deal of it is dependent upon a diseased gall-bladder. Whether gallstones are present or not in these cases, we do not know positively, but there is an infection of the gall-bladder in some way which interferes with digestion, more or less. Therefore, when we open the abdomen for other purposes, if we are reasonably sure the patient is all right, and find gallstones we should never leave those gallstones without opening the gall-bladder and removing them.

Dr. Hiram N. Vineberg.—I wish to say that under the influence of the teaching of Dr. Kelly I have been in the habit of doing, until within the past three years, exactly what has been advocated to-day. But after hearing a discussion on gallstones in the common duct and in the gall-bladder by one of the Mayos, it gave me food for reflection; and caused me to change my methods, and it was to this effect: Mayo criticised gynecologists for opening the gall-bladder simply because there were stones in it. He said that in at least 90 per cent. of the cases of gallstones in the gall-bladder no symptoms were present and an operation should not be undertaken. It seems to me that is a rational standpoint to take, and unless we operate in accordance with good sound surgical principles we will justly be very much criticised. Our work will be criticised as superfluous surgery on an organ that is not necessarily diseased. However, if the gall-bladder is really diseased and requires operative intervention, it should be removed. Simply opening the gall-

bladder and removing stones does not effect a cure in these cases, as I have had evidence in my own practice in three or four instances. So I think we ought to take the stand that unless there is an actual indication for opening the gall-bladder we ought not to undertake it simply because it contains stones. On the other hand, if the gall-bladder is at all diseased, it ought to be removed.

Dr. J. Montgomery Baldy.—Like Dr. Edebohls, I would say, as the result of my experience in dealing with gall-bladder troubles, I cannot do work effectively through a small incision in the class of operations under discussion. I must have a good incision to work through, especially in cases in which the gall-bladder is adherent. When the gall-bladder is not bound down by adhesions you can push it up through a comparatively small incision and remove the stone or stones with little or no difficulty.

It is well-known that many people have gallstones for several years without causing them any discomfort, but they may cause great discomfort sooner or later, particularly when infection occurs. Unquestionably, of the large numbers of cases of so-called chronic indigestion many are due to gallstones and to disease of the gall-bladder.

As far as a routine operation is concerned, one should judge as to the social surroundings and physical condition of the patient, and as to whether, at the time one is operating for some other intra-abdominal condition, the patient is able or willing to take the additional risk which a second incision incident to a gall-bladder operation involves. These points must be thoroughly considered. We cannot lay down a given rule to open every gall-bladder in these cases, whether it contains stones or not. However, if a woman is suffering from gallstones which I do not recognize until I enter the abdomen, and her physical condition warrants it, I would not hesitate to remove them. The more I see and read of men's experience with gallstones and of removing the gall-bladder, the more I think the picture is largely overdrawn. Drainage will allow most of them to recuperate and get in a comparatively healthy condition. The removal of the gall-bladder is not such a simple procedure as some surgeons would have us believe. Take a small wound that is made about the liver through the capsule, and you may have a

fistula which will last for many months. I have one such case at present in which a fistula has lasted for six months, and I do not see the end. I closed without drainage in this case after removing the bladder. The woman became markedly jaundiced. I removed a quart or two of bile from the abdomen later, and found a wound in the liver tissue through which bile was spurting as freely as would blood from a severed radial artery.

Dr. Walter P. Manton.– About a year ago I was talking with Dr. Ochsner, of Chicago, who has had a large experience in gall-bladder surgery, and he told me that formerly cases of chronic dyspepsia gave him much trouble, and that he did everything he possibly could for them without relief, but now in these cases he opens up the gall-bladder, finds gallstones, removes them, and cures his patients. I have seen many such cases myself, and I believe the course taken by Dr. Ochsner is the only one to pursue.

I was unfortunate in not hearing the first part of Dr. Clark's paper. He mentioned, however, suturing the gall-bladder after incision, and dropping it back into the abdominal cavity. I have tried that in several cases in connection with other operations on the abdominal or pelvic organs, and found it to be a poor way to do. In nearly all of the cases in which I did this the patients have died as the result of leakage.

With reference to the remarks of Dr. Sutton as to solvents for gallstones, I do not believe that any solvent was ever invented that will dissolve gallstones. I have had patients who have taken olive oil and other supposed solvents for years with little or no relief, and have subsequently removed the gallstones by operation and cured the patient.

In regard to attacking these cases through a small incision or Kelly's operation, it is absolutely essential in my experience to make a large incision, because in a large number of cases we find a single stone in a pocket in the cystic duct, and it is utterly impossible to remove it by means of a small incision. I think we are liable to miss stones by trying to operate through a small incision, and I believe a large one should be made in these cases.

Dr. Beverly MacMonagle.—After reading the title of Dr. Clark's paper I wondered how he would treat the subject. As I understand, the treatment of gallstones in general is entirely separate and apart from the words in the text of the title of the

paper. Dr. Clark, if I understood him correctly, rather advocates that we should investigate those cases in which we open the abdomen for some pelvic and abdominal trouble, with especial reference to gallstones or disease of the gall-bladder. If we find gallstones present at such an operation the question arises, Shall we or shall we not remove them at the time? If these gallstones have been making the patient ill, causing symptoms of dyspepsia or indigestion, if there is any adhesion around the gall-bladder, it seems to me we should operate for the gallstone or gallstones first. If after opening the abdomen for the purpose of dealing with some intrapelvic pathologic condition we find gallstones present that have not yet produced any symptoms, the question comes up, Shall we or shall we not remove them? If the patient's condition will not permit of the removal of the gallstones, in your judgment, at the same sitting, then, of course, it is unwise to operate for their removal, and one should stop short of the pelvic work for which operation was undertaken if the general condition of the patient does not justify proceeding. Some simpler procedure should be done which will tide the patient over the critical period. The argument advanced of operating for gallstones at the same time one is operating for some other intra-abdominal lesion goes without saying, that it should not be done unless the patient's condition, in one's judgment, will allow him to go on with the operation.

With reference to gallstones and the consequences of them, they are very serious. All of the gentlemen who have thus far discussed the subject say that a great many of the symptoms that are due to gallstones are dyspeptic. There is pain in the upper or right quadrant of the abdomen, and they suggest that the consequence of infection following typhoid fever or colon bacillus infection, or anything else, is very much more likely to be grave if we have gallstones in the gall-bladder than it would be if we had no gallstone or gallstones in the gall-bladder. It is wise, if the conditions surrounding the patient and the patient's condition are favorable, to remove what will accentuate the trouble that will come in the future.

Again, the conditions that arise in the pancreas as a consequence of gall-bladder disease and of gallstones are grave, and if we can do something of a prophylactic nature to guard against

disease of the pancreas, without adding to the risk of the patient's life, it is a wise thing to do. This is what Dr. Clark suggested. The older diseases of the gall-bladder that are incident to infection and the presence of gallstones belong to a separate class from those we are discussing in this paper. In this operation it is bad policy for a surgeon to be guided by the counsel of any man who is not present at the time it is performed. Suggestions as to details of the operation are known only to the man or men who see the case at the time, and the surgeon's judgment is better than the combined judgment of all those gentlemen away from the case. Therefore, I say, do not restrict yourselves to any particular method. I have operated by Kelly's method, but I have not found it convenient in some cases. If the gall-bladder is free and the liver is movable, and the gall-bladder is quite large, you can bring it up through the abdominal wall, and by making a small incision remove the stone or stones reasonably well. If you have any adhesion or infection of the gall-bladder, if you have gallstones in the ducts, you must operate by the gallstone method.

In regard to dyspeptic symptoms, undoubtedly a great many of them are due to gallstones, and if gallstones are removed and the bladder and duct properly drained, many of the cases of dyspepsia which are said to be due to enteroptosis will be cured.

Dr. Clark.—The discussion has been so extensive that in closing I shall allude only to some of the chief points in question. First, with reference to invasion of the gall-bladder by bacteria and their etiological role in the formation of gallstones. In my paper I have briefly alluded to Herter's researches in which the bacteriologic side of this question is extensively reviewed. While, as Herter says, there may be a diathetic factor in these cases, nevertheless the evidence up to this time unquestionably points to the formation of biliary calculi through a bacteriologic invasion of the gall-bladder. Very frequently if gallstones are cut through the center and cultures are made the colon bacillus is found as the nucleus.

Relative to the criticism by Dr. Edebohls as to the short incision, I may say that its length depends entirely upon circumstances. The initial incision should always be short until it is definitely determined that one cannot conveniently work

through it, after which it is easy to enlarge it to suit circumstances. If the gall-bladder can be approached through a small incision and the gallstones removed, it is certainly unwise to make a larger one.

According to the carefully compiled statistics of the Presbyterian Hospital, New York, the percentage of gallstones is 7.6 of all individuals coming to autopsy, and from the pathologic records of the Johns Hopkins Hospital, 6.4 per cent.

Concerning the removal of the gall-bladder, I fully agree with what Dr. Baldy has said in reference to this operation. It is unquestionably more serious than a simple cholecystotomy, and unless there is empyema or serious disease of the gall-bladder, it should not be performed. The more I see of these cases the more I am inclined to the belief that cholecystotomy is a much better plan, for I believe drainage of the gall-bladder is of the greatest value in many of these cases on account of the presence of more or less pancreatitis.

In the series of cases which I have reported, one had come under the care of Dr. Musser, and after drainage of the gall-bladder she was immediately relieved of very threatening symptoms of pancreatitis.

I have been very much gratified by this discussion, for I felt that possibly the general trend of sentiment of this Society would be opposed to the coincident removal of gallstones which were not producing apparent symptoms. While I am certain that none of us would be inclined to advise an operation, even if we were able to determine that gallstones were present which had never produced symptoms, nevertheless when the abdominal cavity is opened for some other condition and the gallstones are found, I am equally certain that it is not too radical surgery or surgery founded upon bad judgment to remove foreign bodies which must ultimately produce more or less serious symptoms.

Fig. 1.

Life-size drawing of specimen; external (lateral) aspect. The relation of the ovarian fimbria is seen.

STUDY OF A SPECIMEN OF OVARIAN PREGNANCY.

By J. Clarence Webster, M.D.,
Chicago.

The following notes concerning a case of ovarian pregnancy have been kindly sent to me by Dr. E. Evans, of La Crosse, Wisconsin:

The patient was thirty-six years of age and had been married ten years. Menstruation began at eighteen; it had always been regular, of the twenty-eight-day type, and five to six days in duration. The quantity was moderate. There was always migraine at the beginning of the flow, and some pelvic pain throughout.

She had been twice pregnant. The first pregnancy ended prematurely in the eighth month; the last went to term, eight years ago.

She menstruated normally July 4, 1903. Soon afterward the breasts became tender, firmer, and larger. Nausea gradually developed. There was no period in August, and she considered herself pregnant.

On September 7th, while in church, she was taken with severe cramps in the abdomen. Pallor of the face was noticed, and she felt somewhat faint. She was able to walk to her home, where she went to bed, the pains being relieved by hypodermic injections of morphine.

On the following day blood escaped from the vagina, continuing about the same time as her normal menstrual flow. It contained clots and shreds of tissue. Colicky and labor-

like pains were felt, causing her to remain almost continuously in bed, morphine being frequently necessary. On October 1st blood again appeared, and continued to flow several days.

On October 6th Dr. Evans described the condition as follows:

The abdomen was tender to pressure in the right iliac region. On bimanual examination the uterus was found to be normally placed, slightly enlarged, and movable. The left tube and ovary were normal. On the right side of the uterus a rounded mass larger than the uterus and distinct from it was easily felt. It was tender to pressure, and only slightly movable.

Abdominal section was then performed. Half an ounce of dark fluid was found in the uterovesical peritoneal pouch. The swelling on the right side of the uterus was attached to the rectum and pelvic wall by many delicate adhesions. The right Fallopian tube was freely movable above it, and was removed along with the swelling.

The specimen was placed in hardening fluid by Dr. Evans at once and sent to me. I immediately made drawings of the external appearance and of a section through the mass, small portions being removed from various parts for microscopic study. The drawings of the microscopic appearances have been made by my assistant, Dr. C. Wahrer.

Macroscopic Appearances. The ovarian swelling is an irregularly rounded mass, measuring 8 cm. vertically and 7 cm. in its other diameters. In its upper fourth the surface is somewhat smooth and dull gray in color; the remaining portion is marked with knob-like elevations, varying in width from 3 mm. to 3.5 cm. They are dark brown or purple, the intervening depressions being much lighter in color. The wall is intact, no indication of rupture being present.

At intervals roughened areas are found indicating the site of former adhesions. Attached to the upper portion of the mass is the upper part of the broad ligament, in which

EXPLANATION OF PLATE.

FIG. 2. Posterior view of specimen. Life size.

FIG. 3. Section of specimen. The wall of the gestation sac, the amniotic cavity, and the intervening extravasated blood containing chorionic tissue are seen.

remains of the organ of Rosenmüller are visible. The greater portion of the Fallopian tube is present, measuring 9 cm. from the divided end to the extremity of the ovarian fimbria. The tip of the latter is in close contact with the ovarian swelling, though distinct from it. No evidence of tubal abnormality is apparent.

On section two portions are to be distinguished, viz., a thin peripheral layer and a large medullary area.

The peripheral layer forms a definite outer wall, concentrically striated, gray in color, here and there tinged pink, and containing many bloodvessels.

The greatest thickness is found at the upper portion, near the junction of the broad ligament, where it measures 5 to 7 mm. Toward the lower two-thirds the rim diminishes in thickness, the part farthest from the broad ligament being less than 2 mm. The medullary area forms the main portion of the mass. It has a mottled appearance, presenting pink, red, brown, purple, gray, and yellow areas. Striation is everywhere seen, being irregularly or, in parts, radially marked.

Toward the lower and outer portion, just external to the middle of the swelling, is a cavity (amniotic), whose lining is smooth and glistening and of a blue-gray color. It contains a few drops of turbid fluid. It measures 2.2 cm. transversely and anteroposteriorly and 1.5 cm. vertically. Its shape, therefore, corresponds closely to that of the entire swelling.

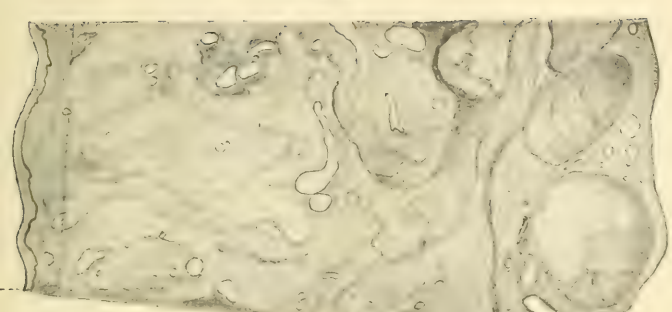
Microscopic Appearances. The peripheral layer is composed of connective tissue, the fibers of which run in all directions, though for the most part they are arranged parallel to the surface, and for the most part closely packed together. The connective-tissue cells are fairly regular in size, and are mostly spindle-shaped, though some round and oval cells are seen. They correspond in size to those found in the normal non-pregnant ovary. Here and there a few leukocytes and red blood corpuscles may be found

extravasated in the connective tissue. At intervals large, rounded, spindle, oval or polygonal cells, varying somewhat in size, are found in the connective tissue. They possess usually a well-defined border, the cell-substance presenting a more or less homogeneous consistence, in which under a high magnification a reticulated structure can generally be distinguished; the nucleus is large and stains deeply, the nucleolus being well marked. In some cases two nuclei are found, occasionally three. In some cases the cells have a hyaline appearance, and their outlines may be lost. They may be blended with other cells or with surrounding connective tissue, presenting hyaline degeneration. In these the reticulated structure may be lost; they may be vacuolated, and the nuclei may be irregular or fragmented. These cells are mostly found near large blood spaces in that part of the gestation sac near the hilum, and in the layers nearest to the ovum. I have not noticed any in the remaining thin portion of the sac wall. Away from the neighborhood of the blood spaces, as a rule, few of these cells are found, and they are usually single.

The determination of the nature of these cells is a matter of much difficulty. They bear a closer resemblance to decidual cells than to any other. That they are wandering cells derived from the syncytium does not seem likely, because the cell-substance is not so dense as that of the syncytium found on the chorion, and the nuclei are much larger. Moreover, in the majority of instances there is a definite cellular arrangement, the outline of each cell being well marked; they are not the irregular nucleated strands which are found invading the mucosa in uterine and tubal pregnancy. The cells are also very much larger than those of the Langhans layer of the chorion.

They bear some resemblance to wandering lutein cells, but the only portion of corpus luteum found in the specimen is situated at a considerable distance from that part of the wall in which the large cells are chiefly noticed, and its cells are

Fig. 4.

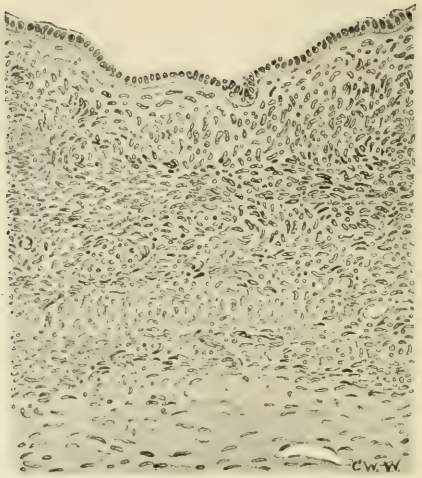


Complete section extending from surface of ovary to amniotic cavity. The largest portion consists of extravasated blood and fibrin, in which villi are seen. *a*. Amnion and chorion. *b*. Ovary. Magnified 7½.

Fig. 5.

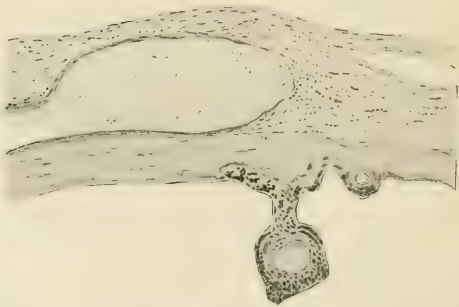
Cortex of ovary. In the deep layer, nearest the ovum, large blood sinuses are shown. *a*. Surface. *b*. Sinus. Magnified 7.

Fig. 6.



Section of cortex with germinal epithelium on the surface
Magnified 175.

Fig. 7.



Villus attached to gestation-sac wall consisting of ovarian stroma. There is some hyaline degeneration in the deeper wall of the latter.
Magnified 41

smaller than those under consideration, and much degenerated. Moreover, the characteristic yellow pigment of the lutein cells is absent. Many of the cells resemble those found lining the wall of some blood sinuses, and, indeed, in some parts seem to be continuous with the latter, which appear to be proliferated endothelium. The extension around vessels of proliferated endothelium (trophospongia) has been described by Hubrecht as being characteristic of the changes in the mucosa of the hedgehog during early pregnancy. I have also observed the process to a limited extent in one specimen of human tubal gestation. The appearance presented in certain parts of my specimen of ovarian pregnancy is somewhat suggestive of a similar change.

The portion of the sac wall nearest the hilum bears most resemblance to normal ovarian tissue. A few primary Graafian follicles and remains of corpora albicantia are found. No large follicles have been seen in the sections examined. It is evident that many follicles have been destroyed by the pressure exerted by the great distention of the ovary due to growth of the ovum and blood extravasation. In the large thinner portion of the sac wall no follicles can be found, nor are there many bloodvessels. The latter are most numerous in the thick portions of the wall nearest the broad ligament. In some of the arteries thickening of the intima is found as well as hyaline degeneration in the wall. The latter change is also found in the walls of veins.

Many of the capillaries and venules are distended, forming large blood sinuses. These are found especially in the deeper layers of the gestation sac, nearest the hilum. Some of them open directly into the intervillous space. In many the endothelial lining is very distinct; in others very few cells are found.

Here and there these spaces are lined by the large cells, to which reference has been made. They are arranged as a single layer or in several layers, extending sometimes more

or less continuously around the lumen, but most frequently occurring in localized areas. These cells are epithelioid in nature, and are more or less irregularly rounded. Their outlines are distinct; the cell substance is composed of a network which varies in density, but is usually loose. Some of the cells may have a hyaline appearance; they may be vacuolated, or the nuclei may be fragmented or irregular. The nuclei are single or double. In some parts these cells appear to be extending into the surrounding connective tissue.

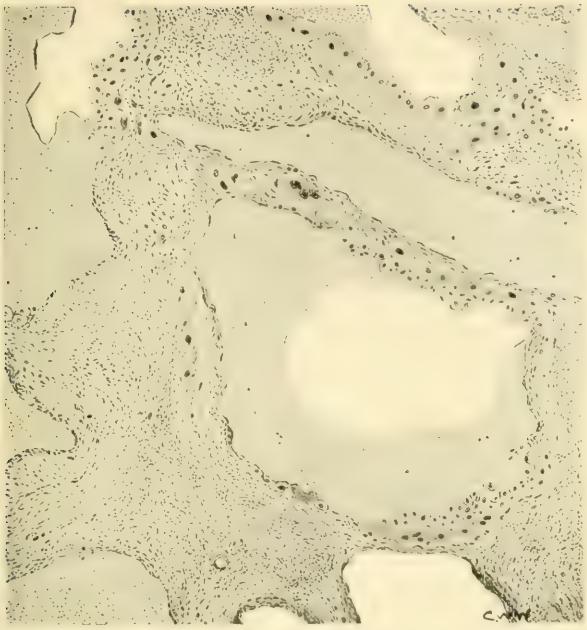
Hyaline fibrinous degeneration to a slight extent is found in the connective tissue of the thick portion of the gestation sac near the intervillous space, though in places it is difficult to distinguish this from layers of fibrin formed from extravasated blood.

Small pieces of fetal syncytium are found in the thickest part of the sac wall. In most instances they appear to lie in spaces. There is very little indication of direct invasion of the wall from the surface to which the ovum is attached. The syncytium and villi are found on the latter only at considerable intervals, a layer of thick fibrin formed from extravasated blood occupying the great extent of this area.

The amnion is fairly well preserved, its epithelial cells being mostly cuboidal, the height varying at different parts. In many parts no distinction between cells can be made out. In parts the latter are flattened parallel to the surface, and are frequently shrunken. Its connective tissue is a thin layer which for the most part is closely blended with the chorion external to it. The delicate loose connections so common in uterine pregnancy are scarcely found. The connective tissue has a swollen hyaline appearance in many parts.

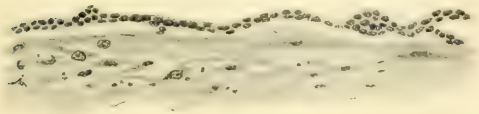
The chorionic epithelium consists of syncytium and Langhans' cells arranged in two or more layers. Degenerative changes are present, there being vacuolation shrinkage and vacuolation of nuclei, invasion by leukocytes, and blending of many of Langhans' cells. Buds of syncytium and villi

Fig. 8.



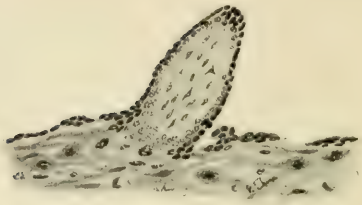
Ovarian stroma, near ovum, containing large blood sinuses. Large cells lining the vessels and in the stroma are shown. Magnified 87.

Fig. 9.



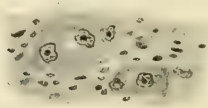
Layer of syncytium on inner surface of gestation-sac wall (ovarian stroma). Magnified 205.

Fig. 10.



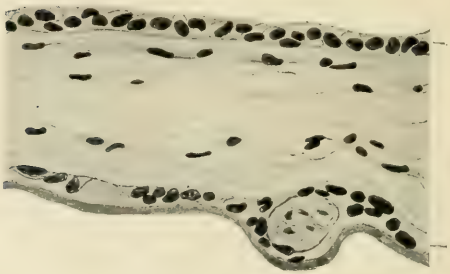
Villus attached to gestation-sac wall. Syncytium is seen on the surface of the latter. Decidua-like cells are seen in the stroma. Magnified 205.

Fig. 11.



Two large detached cells lying in ovarian stroma. Magnified 205.

Fig. 12.



Section of amnion and chorion. Magnified 203.

are attached to the chorion, and resemble those structures as they appear in uterine and tubal pregnancy.

Between the chorionic layer and the gestation sac wall of ovarian tissue there is a large mass of tissue consisting of blood in various stages of alteration and chorionic elements—*e. g.*, villus stems, villi, and masses of syncytium in various stages of degeneration. In the most extreme degree of the latter change, the villi and syncytial strands have a hyaline appearance, no nuclei or cell outlines being visible. Here and there sections of syncytium and villi are found with very little trace of degeneration. In the majority of villi retrogressive changes are found, *e. g.*, cellular irregularity, vacuolation, shrinkage, disappearance of nuclei, hyaline changes, etc.

Remarks. The topographical relationships of the gestation sac in this specimen are beyond dispute. The ovum is situated entirely within the substance of the ovary. It is interesting to compare the conditions described with those found in other specimens. The most careful accounts hitherto published are those by Van Tussenbroek, of Amsterdam, and Thompson, of Portland, Maine. From the extent of corpus luteum in relation to the outer part of the ovum in their specimens, these observers believe that the gestation must have begun in the ripe Graafian follicle. In my specimen no such relationship of corpus luteum is found, and if the fertilized ovum developed in a Graafian follicle it was one in which there was no formation of corpus luteum. Those who describe follicular development of ovarian pregnancy usually assume that the ovum is fertilized *in situ* in the follicle. While this is possible it has not been proven, even though Stratz has demonstrated the entrance of spermatozoa into a ruptured follicle in the ovary of Sorex. The absence of a corpus luteum in the wall of the gestation sac in my specimen certainly seems to prove that the ovum has developed elsewhere than in a ripe follicle.

Until we possess specimens representing earlier stages of pregnancy we shall be ignorant of the original relationships

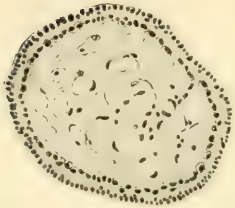
of the ovum. In some of those described as primarily follicular it may be that embedding of the ovum occurred external to a follicle, and that afterward extension into the latter took place.

From what we know of the marked phagocytic properties of the early epiblastic covering of the ovum, whereby rapid embedding within the uterine mucosa is brought about, it is not at all impossible that a similar process may sometimes occur on a flattened area or in a depression on the surface of the ovary. It has certainly been demonstrated in connection with the ovarian fimbria.

The method of the early embedding of the ovum in ovarian pregnancy is certainly the feature of greatest scientific interest in connection with the whole subject. For a number of years I was one of a large number who were skeptical as to the existence of primary ovarian gestation, considering that specimens previously so described were either teratomata or pregnancies in the tube or its derivatives which had entered into intimate relationships with the ovary. Owing to the demonstrations of Van Tussenbroek, Thompson, and a few others, all skepticism as to the occurrence of primary ovarian pregnancy must be put aside. For some years I have held that, on phylogenetic grounds, there is a strong reason in favor of believing that the fertilized ovum in the human female can only *begin* its development in tissue derived from the Müllerian tract. At the present time there are doubtless many who think that the recent demonstrations of ovarian gestation necessitate a modification of this view. Such a conclusion must be considered as hasty and ill-considered.

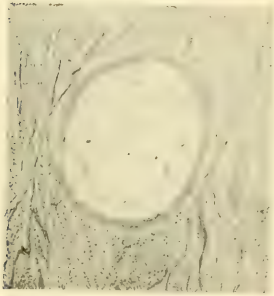
We know that a fertilized ovum may be embedded on a very small portion of a fimbria or on a detached portion of the Fallopian tube attached to the broad ligament. If it can be established that Müllerian tissue may occasionally be found in the ovary it is reasonable to suppose that embedding of an ovum may take place in this tissue. The occasional blending of Müllerian and ovarian tissue has been abun-

Fig. 13.



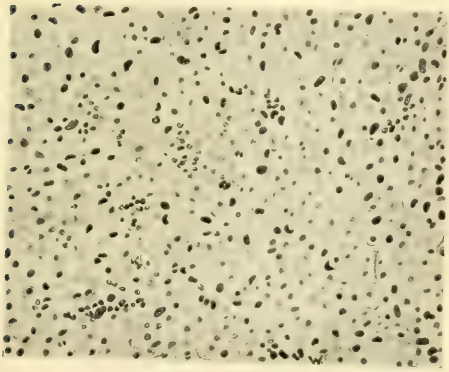
Transverse section of villus. Magnified 87.

Fig. 14.



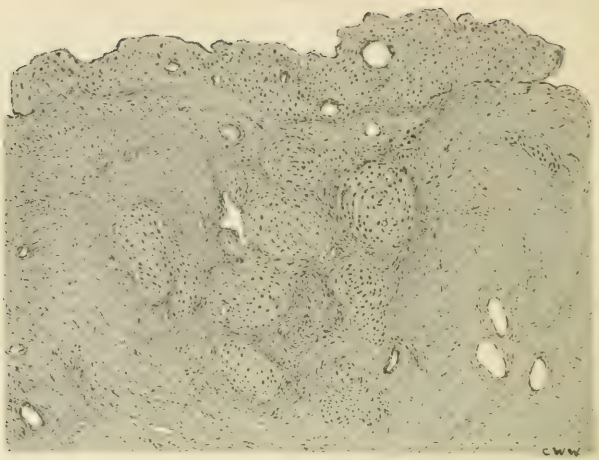
Degenerated villus lying in blood clot. Magnified 87.

Fig. 15.



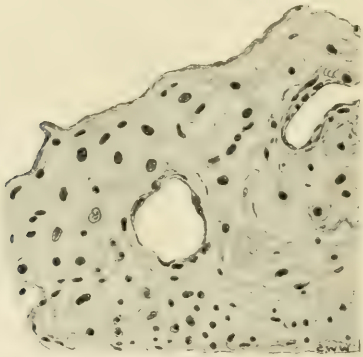
Portion of degenerating corpus luteum. Magnified 206.

Fig. 16.



Changes in the ovary during uterine pregnancy. Area containing decidua-like cells at surface of ovary. The specimen was removed from a woman in whom Porro-Cesarean section was performed on account of pelvic contraction. Magnified 41

Fig. 17.



Changes in the ovary during uterine pregnancy. Area containing decidua-like cells at surface of ovary. From case of Porro-Cesarean section. Magnified 205.

dantly proven, both by macroscopic and microscopic demonstration. Take, for instance, the relationships of the ovarian fimbria. In some cases its outer end may not reach the ovary; sometimes it may just touch it; sometimes its tip may be embedded in the ovary; sometimes a considerable extent of the fimbria may lie against the ovary or be adherent to it; in some cases there may be a break in its continuity, so that a small outer portion may lie close to the ovary detached from the main part. Marchand has directed attention to the early close relationship between the tubal epithelium and that covering the surface of the ovary, and has pointed out that they are one and the same surface. He believes that in some cases the line of demarcation, instead of being at the end of the ovarian fimbria, might reach over to the lateral portion of the ovary, and that from its processes might extend into the cortex of the ovary. The observations of De Sinety and Melassez, in 1878, seemed to establish the correctness of such a view. Other studies, especially those of Whitridge Williams, leave no doubt as to the occasional extension of Müllerian tissue into the ovary.

In this connection I wish to direct attention to the recent observations of Schmorl and others to the occasional occurrence of small localized areas of decidua-like cells in the ovary in cases of uterine pregnancy. I have recently examined ten specimens in my museum, and have found these changes in four ovaries. In each instance the areas were situated in the cortex at or near the surface, sometimes projecting slightly from the latter, sometimes extending for a considerable distance into the cortex. The cells in these areas present the closest resemblance to the uterine decidua in normal pregnancy, the cells showing similar variations in size and shape. The line of demarcation from the surrounding ovarian stroma is always well marked, giving the impression that the two tissues are distinct. Usually, these areas contain dilated bloodvessels, which are not found in the neighboring unchanged ovarian stroma. I have never found

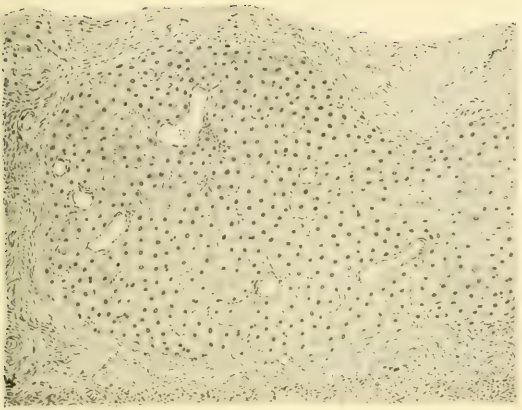
such areas in ovaries removed from non-pregnant women. They are not peripheral sections of the theca interna of ripening Graafian follicles or of the corpus luteum, which is a derivative of the latter. The cells of the latter may undoubtedly closely simulate decidual tissue, both in their well-formed and in their degenerated condition, but the special peculiarities which distinguishes them and their relationships to the follicle usually suffice to establish their identity.

These cortical localizations of decidua-like cells in the ovary of pregnancy certainly suggest some special characteristic which makes the cells capable of undergoing the same genetic reaction which is ordinarily found in the uterine and tubal mucous membranes when pregnancy develops in relation to these tissues.

Tentatively, I advance the view that these areas represent detached portions of Müllerian tissue which have become attached to the surface of the ovary. Occasionally I have found in the substance of such an area a gland-like space lined with columnar or cubical epithelium. The latter may, of course, be only a derivative of the surface germinal epithelium, but it may represent included Müllerian epithelium.

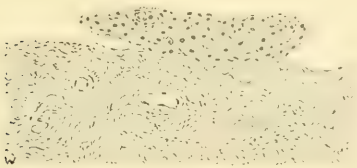
It is possible that the special genetic action in these areas may sometimes determine the embedding and growth of a fertilized ovum in the ovary, and if the opinion that these areas are Müllerian in origin be correct it is not unlikely that all cases of pregnancy in ovarian tissue may still serve to support the dictum which has been expressed, viz., that the fertilized ovum in the human female begins its development in Müllerian tissue. While the proof of this is impossible, *a priori* evidence is in its favor. Those who attempt to overthrow the hypothesis certainly undertake a heavy task in trying to establish an exception to the uniformity of performance of one of the most highly specialized functions in the human body.

Fig. 18.



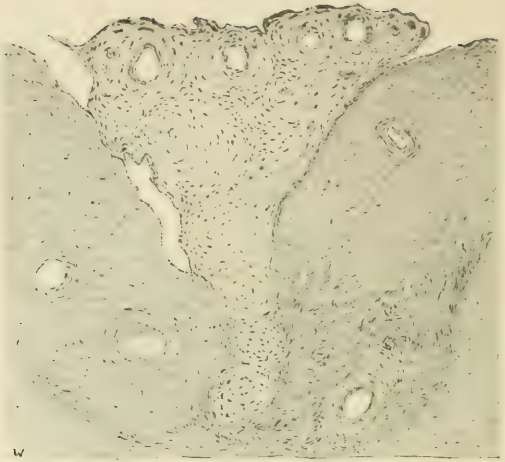
Changes in the ovary during uterine pregnancy. Area containing decidua-like cells at surface of ovary. The specimen was removed from a woman whose uterus was removed in the fourth month of gestation on account of fibroids. Magnified 87.

Fig. 19.



Changes in the ovary during uterine pregnancy. Area containing decidua-like cells at surface of ovary. The specimen was taken from a woman who died of eclampsia in advanced gestation

Fig. 20.



Changes in the ovary during uterine pregnancy. Area containing decidua-like cells at surface of ovary. The specimen was removed from a woman in whom Porro-Cesarean section was performed on account of pelvic contraction.

Fig. 21.

Changes in the ovary during uterine pregnancy. Areas containing decidua-like cells at surface of ovary. The specimen was taken from a woman in whom abdominal hysterectomy was performed in the seventh month of gestation on account of uterine fibroids. Magnified 87.

It may be true that no definite decidual layer is found in relationship to the villi in the specimens demonstrated by Van Tussenbroek, Thompson, and myself. Though Van Tussenbroek in her first description mentioned a decidual layer, she afterward stated that this was an error, the cells being in reality lutein cells of the corpus luteum. Her final account is doubtless in the main correct, but she cannot deny the possibility that some of the large cells were decidual. However, admitting that no decidual layer is found in specimens as advanced as those mentioned, we do not know that they were not present in a much earlier period when the ovum was very much smaller. One of the small decidual areas above described would very soon disappear as a result of the outward pressure of the expanding ovum, as well as of its phagocytic powers, if there were no more tissue capable of undergoing the change, and it is quite evident that the ovarian stroma proper does not tend to take on decidual characters.

Though no definite layer of decidua is found in my specimen, I have little doubt that the scattered groups of large cells found in the ovarian stroma, nearest the ovum, are decidual in character.

Even in tubal pregnancy, where decidual changes are always present in the early stages, there may be a marked disappearance as pregnancy advances, the production of cells being evidently much poorer than in the uterine mucosa in normal pregnancy, though in the latter there is considerable range of variations.

For several years I have held the belief that decidual transformation is peculiar to the Müllerian tract. The presence of occasional areas of decidua-like cells in the ovary in pregnancy has been mentioned as an exception. From what I have already stated it remains to be proved that these areas are not Müllerian in origin. Small localized decidual nodes have also been found in the broad ligaments. I believe that these are also derived from detached portions of Müllerian tissue which are quite common, especially in the upper

portions of the broad ligaments. Similar areas have also been found under the peritoneum of the pregnant uterus, but this cannot be considered as at all remarkable, however exceptional it may be, since there is no doubt as to the Müllerian nature of the uterus. I have also found decidual transformation occasionally in the connective tissue between muscle bundles in the middle of the wall.

Similar areas have also been described under the peritoneum of the pouch of Douglas, and it is not at all impossible that these may be detached portions of Müllerian tissue.

DISCUSSION.

Dr. J. Whitridge Williams.—I have been very much interested in Dr. Webster's paper, and the specimen upon which it is based. To my mind there can be no doubt as to its ovarian nature; and it is particularly pleasing to have so ardent an opponent of the possibility of ovarian pregnancy as Dr. Webster follow the example of Bland Sutton and come forward to acknowledge his error. In view of such examples, I think that the theoretical opposition to the possibility of such a condition will soon disappear. For years I have believed that ovarian pregnancy occasionally occurred, but at the same time I consider it the rarest form of extrauterine pregnancy, and no matter how carefully specimens may be examined in the future, it will always remain so.

I must confess that I am quite skeptical as to the possibility of Müllerian elements embedded in the ovary, affording the basis for an ovarian pregnancy; and while there is no doubt that such tissues are sometimes found in the ovary, as was first demonstrated by me and later confirmed by others, I think we should be going beyond the facts to attempt to explain the origin of ovarian pregnancy in such a way. It seems to me that Dr. Webster clings too strongly to his decidual reaction theory, and is going to unnecessary lengths to assume such a confirmation of it.

In addition to the locations mentioned by Dr. Webster, de-

cidual formation likewise occurs upon the peritoneal lining of Douglas' cul-de-sac, not only upon its uterine but also upon its rectal aspect. I would, however, require a considerable stretch of the imagination to attribute decidual areas in the latter location to Müllerian elements. I have seen such formations in a number of cases in which the peritoneal covering of Douglas' cul-de-sac was studded with minute nodulations, giving it an appearance similar to that observed in miliary tuberculous peritonitis. On making sections through such structures, they are found to be identical with the decidual areas found upon the posterior surface of the uterus and broad ligaments and ovaries.

Indeed, at present, the entire relationship of the decidua to extrauterine pregnancy, whether tubal or ovarian in character, cannot be regarded as definitely settled. I believe that decidual tissue is always formed in such cases, though rarely as a continuous membrane, as was formerly believed, since in the vast majority of cases it occurs only in small discrete patches. I therefore cannot accept the statements of certain German authorities, who deny its existence in most cases, and state that the cells which have been described as decidual are really fetal in character, and represent Langhans' cells. No doubt this mistake has frequently been made, but careful study should enable one to differentiate between the two varieties of tissue.

Moreover, I consider that the part played by the decidua has been grossly exaggerated, as I do not believe that its formation is necessary so far as immediate nidation of the ovum is concerned. My observation and study have led me to consider that its chief function is to limit the invasion of the maternal tissue by the fetal trophoblast at a later period, thereby determining whether the pregnancy will go on naturally or end in a pathologic manner. Thus, when the decidual layer is fully developed, as in the uterus, the pregnancy tends to go on to full term; whereas, when the decidual formation is scanty and discrete, as in many cases of tubal pregnancy, there is nothing to prevent the chorionic elements from burrowing into the wall of the tube and causing the degeneration of its muscular elements, with subsequent opening up of large bloodvessels and rupture into the peritoneal cavity or into the lumen of the tube—tubal abortion. Likewise, in uterine pregnancy we sometimes observe the con-

sequences of imperfect development of the decidua, and under such circumstances one of several abnormal conditions may develop. In the first place, we have a direct invasion of the uterine muscle by the chorionic villi, which later leads to difficulty in the separation of the placenta, and necessitates its manual removal during the third stage of labor. In other cases we may have an unusual quantity of chorionic villi gaining access to the maternal circulation and possibly giving rise to the various abnormalities of pregnancy, as pointed out by Veit, Weishardt, and others.

To recapitulate, I consider that the formation of the decidua is not so necessary in order to afford a bed for the nidation of the ovum, as to offer a barrier against the invasion of the maternal organism by fetal cells. It would seem probable if the decidua were not well developed during pregnancy that chorioepitheliomata would occur as frequently during the course of normal pregnancy as we now observe them following hydatiform mole.

Dr. John F. Thompson.—I am very glad, indeed, to have been present to hear a report of this very interesting case, as well as to hear an acknowledgment from Dr. Webster that ovarian pregnancy may occur. Until recently the center of opposition to belief in the existence of ovarian pregnancy had been in Chicago, and was colored by the views advanced by Dr. Webster in his book. Dudley, in his book, speaks of the utter absurdity or impossibility of occurrence of ovarian pregnancy. In my own case the specimen was examined by half a dozen of the best men in the country. If I had not had the support of these different men I might have felt I had perhaps made a mistake in reporting it as a case of ovarian pregnancy. The specimen I had was conclusive to the eye, and, at the same time, there was no question about the occasional occurrence of ovarian pregnancy.

In reporting my case I called attention to the nature of the structures in which ovarian pregnancy occurred, and also to the frequency with which rupture may occur in the early days. I see no reason to believe otherwise than that ovarian pregnancy occurs more frequently than we have heretofore supposed. From the nature of the condition of the structures, if pregnancy occurs in a Graafian follicle we get early rupture.

There is no appearance of decidual cells in the section, but each section has the characteristic signs of old layers of corpus luteum.

As to the occurrence of amnion, in my specimen none was observed. Dr. Van Tussenbroek told me about hers, that fragments of the amnion were preserved. In the process of cutting very likely the amnion was obliterated in my case. I am very glad to have heard the most excellent paper of Dr. Webster.

Dr. Edward P. Davis. -I had the opportunity of witnessing the first presentation of Dr. Tussenbroek's specimen at the Congress held in Amsterdam.

About a year ago I removed an ovarian pregnancy, the histology of which has not been completely worked up, although a diagnosis was made very early of the nature of the tumor, with the indications that pregnancy did not originate in a Graafian follicle. The clinical history of the case was one of ectopic pregnancy. The abdomen was opened for supposed tubal gestation; the tube was found free and the ovary in a condition of pregnancy, the ovum having perished from hemorrhage.

I agree with Dr. Williams, that decidua is not inevitably present. Recent strides in immunity have shown that decidua is simply a protection for the mother against the increasing invasion of fetal cells.

Dr. Lapthorn Smith.—From what has been said, unquestionably ovarian pregnancy is more common than we have heretofore supposed it to be. Four or five times I have diagnosed ectopic pregnancy by the clinical symptoms, have operated, and have found hematoma of the ovary. I have said to my students, "Gentlemen, I am sorry that my diagnosis must be wrong, because authorities say that there is no such thing as ovarian pregnancy." But I am glad to know now that there is such a thing, and if those of us who meet with such cases would send these ovaries to men like Dr. Webster, who can make examinations of them, it is my conviction that quite a number of them will be found to have chorionic villi or evidences of ovarian pregnancy.

Dr. Webster.—Some very interesting points have been raised. I felt that would be the case, as naturally there must be room for a great deal of speculation when we are consider-

ing the early implantation of the ovum. Dr. Williams has stated that the majority were not inclined to regard these areas of decidual cells as Müllerian. If they belong to the ovarian stroma proper, it seems remarkable that they are so definitely localized, presenting no evidence of gradual transformation from the latter.

The suggestion of a Müllerian origin has come to me simply because of the occasional occurrence of these changes, and because of their strict localization. At first sight, it might appear to be inconsistent with the Müllerian hypothesis that decidual areas should be found under the peritoneum of the uterosacral pouch; but when it is remembered that Müllerian tissue may be found in the broad ligament detached from the tube, it is not remarkable that fragments may be displaced and detached from the Müllerian tract at the level of the pouch of Douglas.

I am glad Dr. Thompson spoke about the amnion in his specimen. By making serial sections over a wide area, he may be able to discover traces of it.

With reference to the point raised by Dr. Clark, I would refer him to Dr. Williams' monograph on the origin of papillomatous cysts of the ovary, in which full consideration is given to the displacement of Müllerian tissue in the ovary.

URETEROLITHOTOMY.

By J. Wesley Bovée, M.D.,
Washington, D. C.

History. The history of this operation is not devoid of interest. In 1856 Gigon recommended opening the ureter through the loin to remove ureteral calculi. In 1870 Bryant, at Guy's Hospital, incised and explored the renal pelvis through a loin incision. In 1882 Bardenheuer incised and explored the ureteral pelvis for calculi, and sutured the wound made in it. In 1884 Henry Morris proposed rapid dilatation of the female urethra, and urethrotomy just in front of the prostate in the male, and then proceeding transvesically to remove calculi from the very lowest portion of the ureter. At the same time Emmet did vaginal ureterotomy, removing calculi with the curet. In 1885 Cullingworth planned and performed ureterolithotomy through a lumbar incision. In 1887 Ceci removed a calculus from the lower portion of the ureter by the rectal route. Desault, in 1887, used and recommended his kiotome for incising the ureterovesical junction in order to facilitate transvesical extraction of calculi from the lower portion of the duct, and in 1888 Richmond, of Missouri, succeeded in removing a stone lodged near the exit of a ureter by means of rapid urethral dilatation and the introduction into the bladder of a finger and tenaculum. In 1886 Israel reported removing calculi from the upper part of the duct. Bergman, Kirkham, R. B. Hall, Twynam, and others did this operation previous to 1890.

Size and Number of Calculi. The sizes of ureteral calculi vary from the merest particle to dimensions of several inches. According to Henry Morris, Le Dran quotes a case in which there were several calculi, weighing together three ounces, impacted in the middle part of a ureter. In one of my cases the calculus weighed 1310 grains, and had diameters of two and three-quarters, one and three-quarters, and one and one-half inches. This is larger than any I have found recorded. Sometimes several are present, Morris having removed nine from the lower part of one ureter. In some autopsies both ureters have been found filled by a large number of impacted calculi. To find two or three at different points along the duct is far from uncommon.

Routes. The routes for reaching and extracting ureteral calculi are the transperitoneal and the extraperitoneal. The latter may be subdivided into loin, inguinal, vaginal, rectal, sacral, perineal, and transvesical. The transperitoneal route should never be the one of election, as the danger of peritoneal infection from the urine is too great. Infected urine is a condition so constant in ureteral calculus that it is practically never absent, and should almost never be allowed to come in contact with the peritoneum. It may occur, however, that a calculus in the duct may first be discovered or diagnosed when the abdominal cavity is opened for some other condition. In such event one may, in the absence of symptoms indicative of urinary infection and under favorable conditions, remove the calculus transperitoneally. This is particularly true regarding the portion of the ureter under the pelvic peritoneum in women.

Of the extraperitoneal routes the selection will depend largely upon the location of the calculus or calculi, though the operation of Ceci, of removing it through the rectum, could only be considered justifiable when the stone has practically sloughed through into the rectum. Surely the danger of ascending renal infection is very marked. When the calculus lies in the intravesical position of the ureter of a woman

it may be usually removed by dilating the urethra and then the ureteral opening and extraction through both. Morris removed a calculus from the lower part of the duct through an incision along the border of the sacrum. In women the lower three inches of the duct may be fairly well reached through the vagina. Especially is this route available for those cases in which the stone lies in the broad ligament portion. Through a lateral incision the perineal route has its advantages in the male, but not in the female. This leaves for consideration the routes that lie above the bony pelvis. Of these two neither has any advantage over the other, as the indications for each differ from those for the other. In sixty-four cases of ureteral calculi operated on by the extra-peritoneal route the calculus was located twenty-two times in the ampulla and adjoining inch; seventeen in the duct at the iliac crossing; fifteen in the lowest inch; four at the entrance to the broad ligament; one both near the ampulla and at the iliac crossing, and in two the ureter was filled with calculi. This would seem to demonstrate the loin route to be the most frequently employed. If the loin incision be prolonged downward but a little access to the portion just above the iliac crossing will be afforded, and thus 61 per cent. of the cases of ureteral calculi may be treated by this route. I was not able to ascertain the sex in these collected cases, and cannot state how many of the eighteen in the lowest inch were in women, but in that sex the vaginal route, as a rule, is the best, though the transvesical should not be ignored. In the male the inguinal is the best. When the calculus is at the entrance into the broad ligament the inguinal is perhaps preferable to the vaginal route.

In a class of cases characterized by the stone having been lodged in the intravesical portion of the duct, and later sloughed into a pocket in the bladder wall which it has made for itself, the vaginal and inguinal routes are the only safe ones, though in so stating I am not unmindful of the number of cases in which suprapubic cystotomy has been done.

Removing the Calculus from the Ureter. For removing the calculus from the ureter the different procedures have been (1) pushing the stone in a reverse direction to its passage and extracting it through the wall of the duct at a more favorable point, or through the kidney structure; (2) dilatation of the portion of the duct below the calculus and removing the stone through the bladder; (3) longitudinal ureterotomy at the point of lodgement of the calculus, and (4) intraureteral injections of sterilized vaseline, as recommended and employed by Schmidt, of Chicago. The first method has special advantages and is applicable to the whole length of the duct save the lowest inch. In many cases the kidney must be explored as well, and if the stone can be forced back through the kidney incision it is preferable to ureterotomy. Even if the kidney is not incised extraction after pyelotomy is better than by ureterotomy farther down, as there is less apt to be interference with healing of the incised wound from necrosis or bruising, and less danger of angulation or lessening of its caliber. When a stone, especially of the mulberry type, has been lodged at one point a considerable time it is apt to corrode the ureteral wall to a marked extent. Such corrosion interferes with good and prompt union if ureterotomy is done at that point. Therefore, the duct should be opened at some point above the lodgement and at the same time conveniently reached through the operation wound. Here healthy tissue may be traversed that will be rapidly repaired, and with much lessened danger of ureteral constriction. When the calculus is lodged in the intravesical portion, no doubt transvesical extraction is best. This may be done by dilatation of the ureteral orifice and the portion of the duct separating the stone from the bladder cavity. Should stricture within this portion be present it may be divided at the same seance. Young, of Baltimore, has found these in a few cases, and probably that was the condition noted by Desault in 1887 which gave birth to his kiotome. The ureteral dilatation and lithotomy mentioned may be done in most

cases by the use of the cystoscope. But in some cases, and especially when the calculus is large, suprapubic or vaginal cystotomy will be required. When the calculus is lodged in the broad ligament, or in the male in the juxtavesical portion, great difficulty may be encountered in attempting to move the stone backward along the duct, and dilatation of the untravelled portion rendered hazardous. Again, the size of the calculus may at once preclude all possibility of such work. In a recent case I found a calculus weighing 1310 grains and having transverse measurements the extremes of which at the largest point were one and three-quarters and one and one-half inches. In such instances nothing remains to be done but ureterotomy on to the stone *in situ*. The method of Schmidt is probably valuable in small calculi. Kollischer and himself have reported cases successfully treated with it, and they are enthusiastic in their recommendation of it. I have had no experience with it, but its innocence compared to the traumatism of other surgical interventions prompts me to decide to adopt it in cases in which the calculus is small except those in which it is lodged in the very lowest portion of the duct.

Searching for Other Calculi. When the stone has been removed search for other calculi should be made throughout the whole length of the duct, and if the loin incision be the one employed it is advisable to satisfy one's self that none are within the kidney. A sound may be gently passed upward into the calices to assist in palpation, though it may not furnish conclusive proof of the absence of renal calculi. Should ureteral constrictions exist they may be discovered by this systematic exploration of the duct. The possible existence of a second ureter similarly affected should not be forgotten, nor should unnecessary traumatism be produced.

Treatment of the Ureteral Opening. If the ureterotomy wound be through practically normal tissue, and the ureter below it free from obstruction, sutures may be em-

ployed to close the duct. They should be interrupted, placed in two tiers, and pass through all the wall except the mucosa. Absorbable material for this purpose is certainly of special advantage. Even infected urine should not modify this plan, nor should drainage influence it. If the tissue through which the incision is made be necrotic the open wound if small would probably be preferable. If, however, a large calculus be removed the wound must necessarily be long, and sutures must be employed, though leakage seems probable, as the tendency to longitudinal constriction is great with the long, open ureteral wound. Obstruction of the ureter below the wound would lessen the advisability of suturing, though not to its exclusion in all cases. If the function of the kidney has been destroyed by long standing complete ureteral obstruction sutures should not be used.

Drainage. All ureterolithotomy wounds should be drained. This is because the urine is practically never normal, therefore rendering wound infection probable. The possibility of urinary leakage subsequent to operation affords another positive indication for drainage.

DISCUSSION.

Dr. B. Bernard Browne.—This subject calls to my mind a case that came under my observation in 1874. The patient was a woman who had hemorrhages of the bladder, and at the time was passing bloody urine. She was free from pain during the intervals. The pain was intense. I dilated the ureter, found a large quantity of hydatidiform growths, and removed them from the ureter. This case was reported in the *Transactions of the Medical and Surgical Faculty of Maryland* for 1880. After the removal of these growths the hemorrhage continued off and on for about ten days, and then ceased, when the ureter on that side became blocked up; no urine passed through it, but clear urine passed through the other ureter. When the ureter became blocked up and the urine perfectly

clear, great pain was experienced; but when the urine was bloody, the pain subsided. This, I believe, was one of the earliest cases of dilatation of the ureter for the removal of a foreign substance or growth from it.

Dr. Charles P. Noble. My experience with ureterolithotomy is limited to two cases, one of which came under my observation a long time ago, before modern methods of diagnosis were in vogue, and the other a recent one, which was very instructive.

The first case was treated as one of cystitis by a former member of this Society, now dead, by the method of draining the bladder. She had a cystotomy wound open for over a year, which was then closed, with no relief of the symptoms. One could easily palpate what was apparently a small tumor near the ureteral orifice. I supposed, when I did the operation, I was going to operate on a bladder tumor. Opening the bladder from above and feeling this tumor, I was suspicious that it was a stone, and in passing a tenaculum this became evident. The operation was simple. A stone was found situated just in the orifice of the ureter. I slit open the ureter, removed the stone, and the patient made a good recovery.

The second case was that of a man who had the ordinary symptoms of renal colic, and a diagnosis of renal stone had been made, in which I concurred. The patient had not only renal colic, but there was also persistently a small amount of blood in the urine. In this case an *x*-ray examination was made, and the skiagraph showed that the stone was located in the ureter about an inch below the brim of the pelvis. This was a beautiful illustration of the value of the *x*-ray. It saved a useless loin incision and a troublesome hunt for the stone. The operation was done by the extraperitoneal method. In this connection I desire to speak of one point raised in Dr. Bovée's paper, and that is the question of pushing a stone from its location, especially if it is a mulberry stone, before incising the ureter. While it is desirable to do this the fact is that the mulberry stone in my case made it impossible to do it because it was embedded and could not be moved. There was nothing to do but to incise the ureter and take it out where it was. The wound in the ureter was sutured after the removal of the stone, and the patient made an uninterrupted recovery.

In this case I drained the wound, and I think it is a good thing to do. If I should operate again, instead of draining through the primary incision I should make a stab wound and drain through it, so as not to run the chance of a hernia. One needs to drain in such cases, and I believe a stab wound is the better method.

Now, I would like to speak of another point, and that is, how unreliable the *x*-ray may be, because I operated on another case in which no stone or stones were found, although reported by the *x*-ray. We should not depend upon an *x*-ray diagnosis in these cases, but we should utilize other methods of diagnosis. Personally, I would not operate on a case of ureteral calculus upon an *x*-ray diagnosis alone if the clinical diagnosis did not support it or the ureteral catheterization did not support it. Because this error occurred in my own hands, I know it must have occurred in the hands of others.

Dr. Willis E. Ford.—As showing the amount of damage which may be done to the ureter without very serious symptoms, I wish to say that some six or seven years ago I operated upon a patient for a stone situated at the mouth of the ureter. I operated through the vagina. The patient was a young woman, a school-teacher. She had only been laid up three or four weeks, but when I saw her she was septic. I removed the stone, but she died a few weeks later. I made an autopsy and dissected out the kidney. I found the ureter dilated to such an extent that one could put a walking-stick through its entire length, with a sacculated pelvis of the kidney. There was no stone. The condition was simply one of septic kidney. This case illustrates the amount of damage that may sometimes be done to a ureter before operation is undertaken.

Dr. Beverly MacMonagle.—Since the use of the *x*-ray is quite common I have had three cases of stone in the ureter that have come under my observation, and in all three the most expert user of the *x*-ray failed to get any shadow of a stone. A diagnosis of stone was made in one case by the scar on the wax-tipped bougie passed into the ureter, and the stones said to be located in the kidney. The kidney was opened, and a stone was not found. On passing a sound from the pelvis of the kidney through the ureter from above I could get the click of a stone in the ureter. I then opened through the vagina, and with

an alligator forceps removed a small stone from the ureter. Considering the extent of the bougie I had in the ureter, I reasoned that I had the end of the bougie in the pelvis of the kidney; but I was mistaken in that, and the pelvis of the kidney was comparatively healthy.

In the other two cases I did not make a diagnosis of stone at all, and after using ureteral catheters to make a diagnosis, as well as the *x*-ray, I thought there were no stones there, yet five or six days after the use of the catheters small stones were passed in both cases.

Dr. Robert L. Dickinson.—Concerning the route which Dr. Bovée has spoken of as affording ready access well down the ureter by an extensive incision, I report that in a very fat woman, with a stone situated at a point just where the ureter goes over the innominate line, with a low incision ready access was had. I was enabled to palpate the ureter an inch and a half below that point in order to determine what thickening and inflammatory trouble had occurred about it. The stone, elongated in shape, was pushed up without great difficulty and removed. I do not believe an extensive incision is necessary or desirable in order to afford ready access for the removal of stone, on account of the danger of hernia subsequently. The method and route I mention seems to be free from such danger.

Dr. George M. Edebohls.—The paper of Dr. Bovée, I understand, dealt with the best methods of approach in cases of stone in the ureter. Whether the question of diagnosis by the *x*-ray was included or not, I do not know.

The President.—It was.

Dr. Edebohls.—I wish to emphasize by several instructive cases the fallacy of depending upon the *x*-ray for a diagnosis of either renal or ureteral calculi. I have operated on the kidneys of two patients in whom beautiful skiagraphs showed clearly the presence of a renal calculus of large size, and in neither of them was there found the least evidence of a stone either large or small, but in both I found a large collection of pus which had given the deceptive picture of stone.

In another case a false diagnosis of ureteral stones was made by the *x*-ray, the diagnosis having been made by two of the best men in that particular branch of our specialty. The patient,

a woman, aged forty years, suffered for years with attacks of pain along the course of the left ureter, which clinically had been diagnosed as ureteral colic. A presumptive diagnosis of stone was made. Dr. Louis A. Weigel, of Rochester, N. Y., than whom there is no better or greater expert in *x*-ray work in this State, spent two weeks in taking skiagraphs of the renal and ureteral regions, and produced two beautiful pictures showing three calculi in the left ureter. All the calculi were about the same size, probably a centimeter and a half in length by a centimeter in diameter. All were situated in the pelvic portion of the left ureter, the upper one some three centimeters distant from the middle stone, and the middle stone some two centimeters from the lower. Some considerable time later the patient came under my care. She still had symptoms of ureteral colic, and I found that she had in addition a chronic nephritis, which had not been diagnosed, and which had existed I cannot say how long previous to my diagnosis. I had Mr. E. W. Caldwell, of New York, who is admitted to be a good man in *x*-ray work, make a picture of the left ureter. He reproduced the three stones found by Dr. Weigel, the same sized stones, in the same relative and absolute positions. All the skiagraphs, those of Dr. Weigel as well as that of Mr. Caldwell, are in my possession.

On the strength of the clinical symptoms, backed by the skiagraphs, I made an incision in the loin and approached the ureter extraperitoneally. Two weeks previously I had decapsulated both kidneys for chronic nephritis. In operating on the left kidney I laid bare the upper end of the left ureter for four inches from the kidney down, examined it and the renal pelvis and found both free from stone. At the second operation an incision was made in the left groin, exposing the balance of the ureter extraperitoneally. It is not difficult to do this in a woman. A thorough exploration of the left ureter, centimeter by centimeter, was made, extending from kidney to bladder, and there was no indication of a foreign body in the ureter anywhere. The search extended over half an hour, and I also tried to find out what had given the false *x*-ray pictures. All I could make out were some moderately large glands running along the vessels and the course of the ureter. The ureter was moderately and symmetrically thickened throughout its

entire length. There was no dilatation. The enlarged glands were taken to be the result of the chronic ureteritis present. The case was one of chronic nephritis with left chronic ureteritis, the latter condition causing the colic.

This case has been very instructive to me, and until *x*-ray work has been brought to greater perfection I do not think we can rely on an *x*-ray diagnosis for renal or ureteral calculi.

After the operations my patient got well. An *x*-ray picture taken by Mr. Caldwell since the operation still shows the presence of the three "shadows" of exactly the same size and in exactly the same relative and absolute positions as before operation.

Dr. Bovee.—I did not take up the subject of diagnosis in my paper because I believe it to be a broad subject in itself. However I am very glad to have heard what has been said as to the reliability of *x*-ray pictures. It exactly coincides with my views. In one case in which I had an *x*-ray picture taken of a patient complaining of pain in the right iliac region I made an incision, removed the vermiform appendix and considerably hypertrophied lymphatic gland close to the cecum. There was nothing in the ureter at that point. After removing the gland there was nothing abnormal I could feel along the ureter by sense of touch. I did not explore the ureter. The patient complained of no more pain.

When Dr. Kelly presented his wax-tipped bougies at the Chicago meeting a few years ago some of you may remember that I told him there were some calculi which the wax-tipped bougie would not detect, and these are tubular calculi. These tubular calculi will give very little trouble. Occasionally they may give a little pain, and the tunnel through them is sufficiently large to let the wax-tipped bougie pass through easily without touching them.

As to the dislocation of calculi in the case Dr. MacMonagle referred to, I would say that is a very common occurrence for calculi to be developed of that small size, as shown in the pelvis of the kidney or kidney itself by the *x*-ray, and when the operation of nephrolithotomy is done the stones are found far down in the ureter, possibly getting by the normal constriction, half or three-quarters of an inch below the pelvis of the kidney or ureter, and lodging at the narrow constriction just above the iliac fossa. That is a common observation in cases of nephrolithotomy.

NEPHRECTOMY FOR TUBERCULOSIS OF THE KIDNEY, WITH A REPORT OF FOUR CASES.

By Hiram N. Vineberg, M.D.,
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I feel that I ought to offer an apology for coming before you with a paper based on so small a number of cases. But as the series, small though it may be, brings out prominently some important points on the subject of renal tuberculosis, I venture to present the cases in the hope that they may excite profitable discussion.

Renal tuberculosis is of special interest to the gynecologist for several reasons: (1) In the first place, it is a legitimate expansion of his specialty; (2) it is a disease most frequently met with in the female sex; (3) it is a disease which the gynecologist not infrequently is the first to detect among the cases sent to him for intractable cystitis, presumably due to some uterine disorder.

The gynecologist, from the nature of his work at the present time, can no longer be considered an amateur in the domain of renal surgery. He who has, I may almost say, in his daily work to lay bare the ureters along their whole pelvic lengths, perhaps excise a portion of the bladder, implant a divided ureter into the bladder, or anastomose the two cut ends of the ureter, or be forced to remove a kidney at the termination of a difficult pelvic operation, ought surely to be able to perform any procedure upon the kidneys that surgical principles demand. And thus it happens at the present day that ureteral surgery is linked

with the names of several gynecologists, and when kidney surgery is mentioned the names of at least two gynecologists stand out in great prominence. I have reference to two of our distinguished Fellows, Howard A. Kelly and G. M. Edebohls, both of whom have done pioneer and yeoman work in that direction.

It is not my purpose to enter at any length into the symptomatology or diagnosis of renal tuberculosis. It will be my aim rather to dwell upon some of the salient points of the disease that may be of special interest to us as gynecologists and to discuss some of the points that are still *sub judice*.

I have already stated that renal tuberculosis is more frequently met with in women than in men. Of Israel's[1] 26 cases operated upon 16 (61.5 per cent.) were in women. In Facklam's[2] collection of statistics nearly the same percentage of the relative frequency in the female sex obtains. He collected 103 operative cases, 73 (70 per cent.) of which were in women. At the recent German Congress of Surgery Kümmell,[6] of Hamburg, reported having operated upon 48 cases of renal tuberculosis, only 15 of whom were in the male sex. Krönlein at the same meeting reported 51 cases of renal tuberculosis, all of whom but 13 were women. But it must not be inferred from these figures, as Israel remarks, that tuberculosis of the kidney actually occurs more frequently in women than in men. Statistics collected from autopsies show no such disproportion between the two sexes. On the contrary, the tables of Morris, Tilden Brown, Fagge and Watson, based on the findings on the autopsy-table, showed that men are more frequently affected than women.

What the figures of the cases operated upon, however, do unmistakably demonstrate is that primary renal tuberculosis is more frequently met with in women than in the male sex. In men the disease is generally of the ascending variety, starting out from the genital organs, and hence is not so

amenable to surgical intervention. But in women such an association does not exist, the genital and the urinary are two separate and distinct systems. Israel was able to find only one case in the literature in which apparently a genital tuberculosis was associated with a renal tuberculosis. The patient in that instance was operated upon for a tuberculous pyonephrosis, and two years later had her tubes and ovaries removed for tuberculous disease. In the 35 cases collected by Hunner,[3] in the services of Howard A. Kelly and his associates in Baltimore, an instance is also related where Dr. Kelly had to operate some years later for tuberculous adnexa.

According to Israel,[1] renal tuberculosis is most frequently met with in the third and fourth decades of life; 80 per cent. of his cases subjected to operation occurred in these decades. He had only one case in the fifth and one case in the sixth decennium. In Hunner's collection, 14 cases occurred in the third and 12 cases in the fourth decade. The ages of three of my patients were forty-six, forty-seven, and forty-eight years, respectively. The age of the fourth patient was thirty-nine years. It would appear, therefore, that the age of my patients was unusually advanced.

Renal tuberculosis is usually very insidious in its course, and may exist for a long time without giving rise to any appreciable symptoms. The first symptoms to manifest themselves in the majority of the cases are those referable to the bladder, and hence it is that the patients are treated a long time for cystitis and no suspicion of a kidney affection is entertained. Three of my patients* had been treated for months for cystitis, and one patient (Case IV.) had been an inmate of several prominent hospitals for a period extending over three years, and at no time was a tuberculous lesion of the bladder or the kidney suspected. There is

* Since writing the above I have operated upon another case of tuberculosis of the kidney which had been treated for nine months for supposed cystitis.

nothing characteristic about the bladder symptoms to differentiate them from a non-tuberculous cystitis except in a manner to which I will refer later.

The urine is usually acid, contains a varying amount of pus, some leukocytes, and, according to Israel, some red corpuscles. Casts are seldom found, and some authorities hold that the absence of casts is characteristic of renal tuberculosis. Tubercle bacilli are found in 59 per cent. of the cases that are complicated with tuberculous cystitis. Hunner maintains that they can always be found if daily examinations are made for a week or longer. In two of my cases daily examinations for tubercle bacilli were made for a longer period than that with a negative result. In only one of the cases (Case II.), in which there was a well-founded suspicion that the disease was primary in the bladder, did we find tubercle bacilli in the urine.

Cystoscopy. A cystoscopic examination may be of great service in making a diagnosis. In some cases an ulcerated area about one of the ureteral orifices may be seen, or the mouth of the ureter may be swollen, presenting a nipple-like projection. In others again there may only be a patch of redness surrounding the orifice, or a red streak extending from the orifice on to the bladder wall. Again, distinct tubercles may be seen in areas of greater or less size scattered over the bladder. Ulcers of varying size with a grayish deposit are occasionally seen. In some cases the bladder is so irritable that the greatest patience has to be exercised before a satisfactory examination can be made.

Some authorities, notably Hurry Fenwick and Willy Meyer, look upon ulceration about the orifice of one ureter, with the rest of the bladder wall being healthy, as pathognomonic of tuberculosis of the corresponding kidney. The sign is an important one, but too much weight should not be attached to it in women, as is shown by the following case:

About two years ago a physician brought his sister to me on account of hematuria and symptoms of cystitis. She

had been delivered of a child a few months before, and the hematuria had occurred since then. On cystoscopic examination there was a distinct erosion surrounding the left ureteral orifice, the rest of the bladder wall appeared healthy. I made an application of a 10 per cent. solution of nitrate of silver to the erosion, and told the doctor that I feared his sister had renal tuberculosis, basing my fears on the statement of the authorities just quoted. The symptoms of cystitis promptly disappeared, there has been no recurrence of the hematuria, and the woman has been in good health ever since. The erosion in that instance was no doubt caused by the pressure of the head during delivery, and was not dependent upon any tuberculous affection. In women it is not uncommon to find patches of hyperemia and even erosions about the uretral orifice, without any further significance than that they are evidences of a localized catarrhal cystitis. They disappear readily on a few direct applications of nitrate of silver solution.

The topical application of the silver salt solution has given me such uniformly good results in all forms of cystitis other than the tuberculous that when I meet with a case of cystitis that resists that treatment I strongly suspect tuberculous cystitis.

Three cases in my series were suspected by me on the basis of that therapeutic test. Subsequent developments confirmed my suspicion. The advice has been given by the President of this Society to first cure the tuberculous cystitis before taking steps to remove the diseased kidney. It would be rather difficult to follow this advice in the majority of cases, as the bladder would be constantly reinfected by the tainted urine. Further, it has been the experience of almost every operator that as soon as the diseased kidney is removed the bladder affection improves promptly and in many instances disappears entirely without further treatment. Of course, it must be admitted that every cystitis in tuberculosis of the kidney is not of a tuber-

culous nature. But whether the cystitis be tuberculous or not, it stands to reason that a cure of it can be more readily effected when the cause (the diseased kidney) is first removed.

Catheterization of the Kidney. As a rule, by the time that a diagnosis of renal tuberculosis has been made there is but little doubt as to which kidney is involved. Catheterization, therefore, to ascertain which kidney is affected is seldom needed; but it is important to ascertain the functional capacity of the supposedly healthy kidney. Theoretically there is some risk attached to catheterization of the sound kidney in the presence of a complicating cystitis which may be due to secondary tuberculosis. But with Kelly's method and the patient in the knee-chest posture the risk is minimal in the hands of anyone who is at all experienced with that kind of work. After the orifice is exposed the end of the cystoscope may be so held as to surround it; then, with a pledget of cotton soaked in an antiseptic solution, the interior of the cystoscope and the mouth of the ureter may be cleansed. The catheter can now be inserted into the ureter without coming in contact with any other portion of the bladder wall than that which is within the lumen of the cystoscope.

Two of my patients had the sound kidney catheterized by me in accordance with the above technic, with no ill results following. Still, to avoid even this slight risk, a fair knowledge of the other kidney may be obtained by placing a catheter into the ureter of the diseased side, siphoning out the residual urine in the bladder while the patient is still in the knee-chest posture, then placing the patient on her back, and whatever urine now collects in the bladder must come from the other kidney, as the catheter drains the urine from the diseased kidney. The urine from the supposed sound kidney should be examined both chemically and microscopically, and also subjected to cryoscopy. The value of the last as a means of determining the functional capacity of the kidney is still *sub judice*. Kümmell, who

perhaps next to Israel has had the largest experience in renal surgery, places great reliance in cryoscopy of the urine, but more especially in cryoscopy of the blood. In a personal communication to a friend he stated that since he had been using these tests he had not lost a case of nephrectomy from inefficiency of the remaining kidney. Israel, on the other hand, looks upon the test as a plaything. From what I have seen of the application of the test I can readily understand that unless it is carried out by an expert it may prove very misleading.*

A simple and fairly efficient test has recently been advocated by Völcker and Joseph,[5] of Heidelberg. These authors have tried to overcome the objections attached to the dyes heretofore in use for the determining of the functional activity of the kidneys. They claim that they have succeeded in doing this by employing indigo-carmin in the following manner: Indigo-carmin, 0.4 gr., is freshly dissolved in 10 c.c. sterile physiologic salt solution. Of this solution 4 c.c. are injected deep into the gluteal muscles. The dye is sterilized by exposure to steam. They have never seen any inflammatory reaction or constitutional symptoms follow. Twenty minutes after the hypodermic injection is given, on cystoscopy blue urine can be seen coming from each ureter in rhythmical jets if the kidneys are healthy. The dye continues to act for twenty minutes after its first appearance. The advantage of the indigo-carmin over the other dyes is that it does not readily mix with the urine in the bladder, and the stream from the ureter can be easily seen and followed to the most dependent part of the bladder when it falls as a blue deposit. Its chief use, it appears to me, would be to ascertain beyond a doubt the existence

* In a case recently operated upon by me at Mt. Sinai Hospital, the cryoscopy of the blood was carried out by one of the house staff. He found the freezing point to be 0.57, which is said to be below the safety point. Nevertheless, the patient made a good recovery, the remaining kidney acting efficiently directly after the operation.

of a second kidney, which, at least, was in a condition of functional activity. The authors express a hope that by further investigation they may be able to estimate the functional capacity of the supposedly healthy kidney by the intervals that elapse between the jets of the urine as they are emitted from the ureteral orifice. The method has been made use of by some of my confrères in Mt. Sinai Hospital, who have expressed themselves as being very highly pleased with it.*

Fortunately for us, renal tuberculosis in women is, in the vast majority of cases, limited to the one kidney. Israel met with only two cases of bilateral disease in 21 cases. Another fortunate circumstance is the slow progress of the disease, so that the other kidney has ample time to gradually acquire the capacity of functionating for the entire economy. Suppression of function of the remaining kidney is a less frequent occurrence in nephrectomy for renal tuberculosis than in nephrectomy for other renal affections.

When I was in Berlin last autumn, I had the pleasure of seeing Israel, in his masterful way, remove several tuberculous kidneys. He told me that it is his practice now to remove the ureter in every case, for even when the ureter looks normal to the naked eye it may show evidence of disease with the microscope. He employs a second short incision parallel with Poupart's ligament for the removal of the ureter. As a rule, he closes the wound with sutures. He prefers to do this, he says, even with the knowledge that in the majority of cases the wound will break open afterward. When the wound does break down he finds that the healing is very much hastened by topical applications of the tincture of iodine. In one of my cases (Case IV.) it was remarkable how quickly the sinus, of over a year's standing, closed with the biweekly applications of this agent.

* I have recently made use of this method in a case of renal tuberculosis operated upon, with recovery. It proved to be very satisfactory, and was not followed by any ill effects.

While the removal of the ureter with the kidney makes the operation more complete, and probably insures a better prognosis, it must not be forgotten that it was not until the past few years that Israel and other operators removed the ureter as a matter of routine. Nevertheless, some of the early cases operated upon are in the enjoyment of good health up to the present, a period of over twelve years in some of the cases. In my first case operated upon, over seven and a half years ago, with evident disease of the ureter, leading to a stricture in the pelvic portion, the ureter was not removed. The patient made a rapid recovery and has been absolutely free from any urinary symptoms ever since.

It is not necessary for me to enter into the technic of the operation for the removal of a tuberculous kidney any further than to say that the excision of the twelfth rib is of great aid in those cases in which the diseased kidney lies for the greater part above the border of the ribs, as it did in one of my cases (Case IV.). When such a step is found necessary, the greatest care, however, must be exercised not to injure the pleura, which would be a much more serious accident than opening the peritoneal cavity.

Although I have been so fortunate as not to have had a death in my four cases,* I fully recognize that nephrectomy for renal tuberculosis carries with it a pretty high mortality rate in the hands of even the most skilled and experienced. Israel's operation mortality is 10.7 per cent., the lowest, as far as I know, of any operator. Hunner's statistics of Kelly's operative cases had a mortality of 14 per cent.; Morris had five deaths in eighteen nephrectomies (27.7 per cent.).

Israel has shown that a primary nephrectomy carries with it a lower mortality rate than when it is preceded by a nephrotomy. Where, therefore, operative interference is

* Five cases now.

indicated in renal tuberculosis, it is safer to remove the kidney at once than to extemporize by first opening and draining the kidney. The ultimate prognosis of nephrectomy for renal tuberculosis in women is good. As already stated, some of the cases operated upon are in good health after the lapse of fourteen years. Of my own cases operated upon seven, five, two, and one and a half years ago, respectively, all but one are in the enjoyment of excellent health. The exception occurs in Case II., which has developed a mild form of nephritis in the remaining kidney. In this case the evidence is fairly strong that the tuberculosis of the kidney was secondary to tuberculosis of the bladder.*

Case I. *Report of a case of nephrectomy for stricture of the right ureter and early tuberculosis of the right kidney* (abstract, *Medical Record*, February 5, 1898).—Mrs. L., aged forty-eight years, referred to me June 15, 1897. Had been under the care of Dr. M. Manges for six months for frequent micturition, pyuria, and pain in the right loin. Later pain most marked in the hypogastric and iliac regions. For three months had apparently improved and gained in weight under general treatment and methylene blue given internally. Then the symptoms returned in greater severity. When seen by me on the above date, the chief symptoms were frequent micturition with some tenesmus and a feeling of discomfort at times amounting to a pain in the hypogastric region, which frequently extended to the right loin. Latterly she had lost some weight, but she was still fairly well nourished and had fairly good color. On bimanual examination the uterus was found small (menopause had been established four years before); extending from the vaginal portion on the right side was a cord-like structure, about the size of an ordinary lead-pencil, running obliquely to the side of the pelvis. A cystoscopic examination after

* The woman presents herself for observation every month. At the last two visits the albumin had almost entirely disappeared, and the patient's general condition was very good.

Kelly's method in the knee-chest posture disclosed the orifice of the left ureter, apparently normal, emitting jets of clear urine from time to time; adjacent to it was a small area of redness and a bleeding point the size of a pin's head. The orifice of the right ureter was irregular in outline, swollen and presented a nipple-like projection. Urine was seen oozing from it continuously rather than in jets. On attempting to pass a catheter into the right ureter it was found to meet with an obstruction about one inch from the bladder. A Kelly ureteral sound met with an obstruction at the same site.

The patient was examined by my friend Dr. Howard A. Kelly, who also found a stricture of the right ureter. Dr. Kelly stated that the diagnosis lay between calculus pyelitis and stricture of the ureter, due to traumatism from ulceration. Both Dr. Manges and myself favored the diagnosis of a tuberculous lesion in the kidney, with secondary ulceration of the ureter, especially as the patient's family history showed a taint of tuberculosis. There were absolutely no pulmonary symptoms, subjective or objective. The urine had been repeatedly examined by a competent man for tubercle bacilli and always with negative results.

The right kidney was removed by me through a lumbar incision on October 22, 1897. It was firmly adherent to the perirenal fat. On its convex surface were scattered several miliary tubercles. On longitudinal section two small abscesses were found: one the size of a kidney bean, in the cortex immediately beneath the capsule; the other, the size of a split pea, in the apex of one of the pyramids. The pus from these abscesses showed tubercle bacilli in abundance. The patient made a rapid and satisfactory recovery, the entire wound being sutured excepting at its lower angle, where a small gauze drain had been inserted. The bladder symptoms promptly disappeared after the operation, and the patient has enjoyed excellent health ever since.

Case II. *Nephrectomy for ascending (?) tuberculosis of the left kidney* (abstract, *New York Medical Journal*, September 1 and 8, 1900).—Mrs. S., aged forty-seven years, had been under my care for several months for what I diagnosed as tuberculosis of the bladder. Before coming to me she had suffered for over six years with painful and frequent micturition. So far as she knew she had never passed blood with her urine. A cystoscopic examination (Keliy's method) disclosed an elongated area of redness studded with small papules occupying the left upper quadrant of the bladder. The upper border of the area was situated some distance from the orifice of the left ureter. Tubercle bacilli, few in number, were found in the urine and in scrapings obtained from the surface of the affected area. When she came under my care, the frequency of micturition during the day was very great every half-hour and every fifteen minutes during the night. Under direct topical application, made twice weekly, the bladder symptoms improved considerably, so that the patient did not have to get up oftener than once an hour during the night, and during the day while on her feet she could easily retain her urine for three or four hours. The local condition underwent varying changes. The redness would at times almost disappear, as would also the papules, but fresh ones would appear from time to time.

After she had been under my observation for over a year (December, 1897, to January 1899), it became evident that the fresh papules were taking a course in the direction toward the left ureteral orifice, and I now noticed that the ureteral orifice presented a nipple-like projection, that I could not enter it with sound or catheter, and that it did not emit jets of urine as it had formerly been doing. The right ureter was catheterized, and the urine obtained from it showed on chemical and microscopic examination to be normal. Up to that time the patient had not complained of any pain in the region of the left kidney. I concluded,

however, that the tuberculous process had extended to the kidney, and advised operative interference, to which the patient would not give her consent, owing to the absence of any subjective symptoms. On palpation the left kidney was found slightly enlarged and slightly tender on deep pressure. It was only two months later (March 3, 1899) that her consent was ultimately obtained, chiefly because she suffered from metrorrhagia, which gave her more concern than the urinary symptoms. It is proper to state, however, that during the past two months her general health began to fail and she had lost considerable flesh. At the operation, the kidney was found extensively adherent to the fatty capsule and was situated pretty high up under the border of the ribs. The wound was closed with sutures, excepting a small space where a small gauze drain passed down to the pedicle. The wound healed apparently by primary union and the patient was up and about at the end of the fourteenth day.

Later, however, the lower angle of the wound opened, giving exit to a small quantity of pus; the resulting fistula took about three months to close.

The excised kidney was slightly enlarged and was made up of cavities filled with pus and caseous material. There was little or no healthy kidney substance to be seen with the naked eye. The contained pus showed tubercle bacilli in abundance.

The patient's general health improved very much after the operation, and she gained over thirty pounds in weight during the following year.

Her bladder symptoms also underwent marked improvement, and she could retain her urine for two or three hours at night. But during the past year her general health has not been so good, though she has not lost any flesh. She passes a sufficient quantity of urine, but it contains a moderate amount of albumin without any other abnormal ingredients. There seems to be some relapse also of the bladder symptoms,

as she has to get up every hour or two during the night, while during the day she can retain her urine three or four hours. A recent cystoscopic examination showed some red areas scattered over the bladder wall, but no papules.

I had reported this case originally as an instance of ascending renal tuberculosis in a woman, but more mature thought makes me doubt the correctness of that view. It is true that the clinical history and operative signs pointed very strongly to an ascending infection, but this is such a rare occurrence in women that before a case is accepted as such the evidence should be unassailable.

Case III.—Mrs. A. L., aged forty-six years; married twenty-six years; seven children, last child nine years ago; no miscarriages. Menses regular until two months ago, since then every three weeks. Had always enjoyed fair health until present illness, which began eight months ago with frequent and painful micturition. Had been treated for cystitis for eight months prior to consulting me. When seen by me micturition was every hour and a half during the day, and about every two hours during the night. As far as she knew she had never passed any blood with her urine, nor did she have any pain in either loin. For the past few months the act of micturition was attended with considerable tenesmus, and she suffered almost constantly with pain over the hypogastrium. A distant relative had had pulmonary tuberculosis, otherwise family history negative. She was fairly well nourished though moderately anemic.

The right kidney lay below the border of the ribs and extended to near the umbilical line. It did not appear to be enlarged, was not markedly tender on deep pressure. The left kidney was not palpable. On cystoscopic examination (Kelly's method) the bladder was found to be very irritable and did not balloon out satisfactorily. Several small ulcerations were seen on the posterior wall of the bladder and a fairly good-sized ulcer near the apex of the

bladder. The urine was acid, specific gravity 1005, moderate amount of albumin, a large quantity of pus, a few hyaline casts, a few red blood cells. No tubercle bacilli were found.

Direct topical applications of soluble nitrate of silver, 10 per cent., were made to the affected areas twice weekly for four weeks. There was some improvement in the frequency of micturition as a result of the treatment, but the pain and tenesmus persisted. She now entered as a private patient into Mt. Sinai Hospital to be under more careful observation and to obtain the benefit from rest in bed.

On May 19th, after being three weeks in the hospital, she began to suffer from some pain in the region of the right kidney and had slight rise in temperature (101° to 102° in the evening). Although repeated examinations of the urine showed no tubercle bacilli, my suspicion of tuberculosis of the right kidney was being very much strengthened, particularly as the right kidney was markedly tender on pressure. Cystoscopic examination now showed the areas of ulceration to be about the same as at the first examination, and the right ureteral orifice was very red and markedly swollen, and the catheter met with an obstruction about two inches from the bladder. The left ureteral orifice was slightly reddened, and apparently clear urine was seen coming from it in rhythmical jets. Under very careful precaution a catheter was passed into the left ureter and 6 c.c. of urine drawn from the corresponding kidney. The urine had an acid reaction, specific gravity 1014, urea 1.8 per cent., a mere trace of albumin, and a very few pus cells, with a small amount of blood, the latter evidently due to the catheterization.

May 30th, Nephrectomy. The fatty capsule was very intimately adherent to the convex border of the kidney, and at one point a small abscess was found. It was with considerable difficulty that the kidney was enucleated from its bed of adhesions. The ureter was considerably thickened

and dilated; I removed it down to the pelvic brim. The patient's condition did not seem to me to warrant the total extirpation of the ureter. The wound was closed in part, the remainder being left open for a strip of gauze to drain the bed of the kidney, and another down to the pedicle of the ureter. The extirpated kidney showed several small abscesses in the cortex, and an ulceration in one of the calices. The report of Dr. F. S. Mandelbaum, the pathologist of the hospital, stated that the process was a tuberculous one.

The patient made a rapid recovery, the left kidney acting promptly and efficiently. The bladder symptoms underwent some improvement after the nephrectomy, but persisted in a minor degree for about six months afterward, disappearing finally under weekly and biweekly applications (direct topical) of nitrate of silver, 10 per cent., and emulsion of iodoform, 10 per cent. An analysis of the urine May 15, 1903, nearly a year after the operation, gave the following results: specific gravity 1010, acid reaction, a faint trace of albumin, urea 1.1 per cent., a few epithelial cells, and a few pus cells; no casts. The faint trace of albumin was doubtless due to the presence of the epithelial and pus cells.

Case IV. *Nephrectomy and excision of the twelfth rib for tuberculosis of the right kidney; treated in various prominent hospitals for intractable cystitis; cure; disappearance of the cystitis after the nephrectomy.*—Miss S. S., aged thirty-nine years, had hip-joint disease in childhood, resulting in marked ankylosis of the left hip-joint, with considerable adduction of the thigh; for three years suffering from very severe cystitis, for which she had been an inmate of the various city hospitals from time to time.

Just before coming under my care in September, 1902, she had been an inmate in a prominent hospital in the city for several weeks, during which time the urine had been repeatedly examined, and the diagnosis of intractable cystitis had been made. Tuberculosis had not been suspected in

that hospital nor in any other of the hospitals where she had been treated for the past three years. She received very little relief from her stay in the hospital and was discharged as a case of incurable cystitis.

When she came under my care she was very anemic and very much emaciated, weighing only 107 pounds, normal weight being at least 130 pounds. Her expression was one of great suffering, she had to urinate every fifteen minutes during the day and at least every thirty minutes during the night. The act was attended with a burning sensation, and was followed by severe tenesmus. She had a constant pain over the hypogastrium. It was only after a direct question that she confessed to having some pain in the right loin for a short time before consulting me. On palpating the right loin, the lower pole of the kidney could be felt just below the border of the ribs, but it was not tender on pressure. Owing to the deformity (the ankylosis) a satisfactory cystoscopic examination could not be made. What could be seen of the bladder wall presented a number of small areas suspicious of a tuberculous process. She was subjected for a few weeks to direct topical applications of nitrate of silver to the bladder. Noting no improvement from the treatment and the pain in the loin becoming more marked, I arrived at the conclusion that she was suffering from tuberculosis of the right kidney. I could just palpate the lower pole of the left kidney and could not detect any abnormality.

On October 24, 1902, I removed the right kidney. The usual oblique incision was made, and the lower pole of the kidney presented. It was normal to the sight and to the touch. The upper two-thirds of the kidney lay behind the ribs, and on palpation was found to give distinct fluctuation. This portion of the kidney was very extensively and firmly adherent; it was not feasible to remove the kidney until the whole of the twelfth rib was excised. The abscess in the upper portion of the kidney was ruptured in the enucleation, and thick, creamy pus escaped in the wound. The ureter

was not thickened, and any attempt at extirpating it was deemed unwise, considering the patient's condition and the difficult operation to which she had already been subjected. The greater portion of the wound had been packed with iodoform gauze, only a few sutures being passed at the upper and lower angle of the wound. The patient rallied from the operation satisfactorily, and the remaining kidney responded promptly to the extra work thrown upon it. On the third day she was passing fifty ounces of urine per diem.

The whole upper two-thirds of the removed kidney was occupied by several abscesses; there was scarcely any kidney tissue left. The pus from the abscesses contained numerous tubercle bacilli. The lower third of the kidney appeared perfectly normal to the naked eye. The upper part of the wound kept discharging grumous material for a long time and was unhealthy in appearance. The unhealthy granulations had to be repeatedly scraped away with a sharp spoon. She left the hospital about six weeks after the operation with still a good-sized sinus. I lost sight of her then until December 30, 1903, a year later. I scarcely recognized her now, as she had improved so much in appearance. She had gained twenty-three pounds in weight, felt well in every respect, had absolutely no bladder symptoms, and was following her vocation as domestic. She still had a small fistula at the upper angle of the wound discharging thick, creamy pus. This healed very promptly under proper drainage and the application of tincture of iodine.

LITERATURE.

[1] Chirurgische Klinik der Nieren Krankheiten von Prof. Jas. Israel, Berlin, 1903.

[2] Langenbeck's Archiv. Bd. 45, s. 716.

[3] Johns Hopkins Bulletin, January, 1904

[4] Surgical Diseases of the Kidney and Ureter. Henry Morris, London, 1901.

[5] Völeker and Joseph, Münch med. Woch., 1903, p. 2082.

[6] Journal of the American Medical Association, May 7, 1904, p. 1241

DISCUSSION.

Dr. Joseph E. Janvrin.—Before the general discussion takes place I would like to report a case which came under my care and upon which I operated. This case differs somewhat in its features from the usual clinical history of tuberculous disease of the kidney. The patient came under my observation seven years ago, and was under my care more or less for two years with what appeared to me at the time and to others who saw her to be calculi in the right kidney. She had the ordinary attacks, apparently, which accompany that condition, during the two years, and did not get better. At the end of two years I advised an operation for the purpose of removing what I supposed was a renal calculus, probably uric acid, as the examination of the urine pointed in that direction. Before operating upon her, however, I examined the interior of the bladder very carefully. I also had Dr. Willy Meyer examine her with me, and he concurred with me that the case was undoubtedly one of calculus, probably in the pelvis of the kidney, possibly in the ureter. The interior of the bladder did not give any distinct pathological indication. There was a slight puffiness around the outlet of the right ureter. I also submitted her to an *x*-ray examination under Mr. Caldwell. This examination showed nothing whatever, which was rather an indication to me that there might be a uric acid calculus in the right kidney. I operated on her four years ago last March, and in cutting down upon the kidney and opening it I expected, of course, to find a calculus. I found apparently nothing. I introduced a small catheter, carried it down through the ureter into the bladder, and found nothing there. I was somewhat nonplussed as to what to do. To my friend, Dr. Torek, who assisted me in the operation, after discussing the matter for a little while, I said: "Doctor, with the history of this case, although I find nothing indicative of a pathological change, I am sure there is some change which needs active interference, and I am going to take the kidney out." I took it out, leaving the ureter, as I found it was not diseased, and had the specimen submitted to a careful microscopic examination afterward, and it was found that the whole pelvis of the kidney was infiltrated with a tuberculous

deposit in the very early stage. That is not the usual history of tuberculous disease of the kidney. There had been no cystitis; but the indications pointed to a calculus in the pelvis of the kidney, and nothing more.

I have narrated this case thinking it would go well with the discussion of Dr. Vineberg's paper, as it materially differs in its history and clinical symptoms from those which we usually get in a tuberculous condition of the kidney. The pain was excruciating at times.

The patient was unusually young, only twenty-four years of age. She recovered her health, and is in good condition to-day.

Dr. J. Wesley Bovee.—The question of primary tuberculosis of the kidney is one of great importance. If one reads the transactions of the late meeting of the German Surgical Association, to which Dr. Vineberg referred, he will be struck, first, with the large proportion of cases in which primary tuberculosis is found in both kidneys and the very small proportion in which one kidney alone is involved. This brings us to the consideration of what are the indications for operation in cases of tuberculosis of the kidney.

In tuberculosis of the kidney we must be sure that the opposite kidney is capable of carrying on the function of excreting urine for the whole body before we decide to remove one tuberculous kidney. We may do nephrotomy and drain one kidney that is the worse diseased, without taxing the other kidney to a great extent, and there may be occasionally cases in which both kidneys are involved, and it is advisable to remove one badly diseased organ. But I think we should be very careful.

As regards cystitis, we find that in these tuberculous kidneys it is a late symptom. I do not think cystitis appears early in the disease. The study of tuberculosis of the kidney has not been carried on sufficiently, but we have been searching for the reasons why we should have early tuberculosis of the kidney, and here we come to the very important element of diagnosis. In the cases which I have studied and collected tubercle bacilli have not been found so frequently as Dr. Vineberg would lead one to infer. For instance, in fourteen cases of extirpation of the kidney and ureter the tubercle bacillus was found in 60 per cent. of the cases in which it was looked for. There are some instances in which we will not find the tubercle bacillus, and if

we wish to make an accurate diagnosis before resorting to surgical measures we must use the tuberculin test, which is not entirely reliable, as it does not show that the tuberculosis is limited to the kidney; or we must use the inoculation test. If we get the inoculation test from urine we feel confident we have tuberculosis of the kidney, while we do not know but what we have tuberculosis in some other structure, and tuberculosis of any other structure will guide us in operating on the case. In operating for tuberculous kidney it is good practice to remove the ureter with it. If the disease begins in the kidney and spreads downward, we do not get tuberculosis of the bladder unless we have tuberculosis of the ureter. You will find you will not get the tubercle bacillus in many of these cases, but if you will examine the ureters carefully you will get a characteristic fibrous formation (connective tissue) of the ureter.

The first or second case of extirpation of the ureter done by Reynier is a good example of what we must expect from leaving the ureter in after extirpating the kidney. He did three partial ureterectomies, the last one removing the whole ureter, before he cured the patient.

Dr. Philander A. Harris.—I wish to call attention to one matter in connection with Dr. Vineberg's paper, and that is painting the bladder with some solution of a sufficiently dark color to show the trickling of urine over the field of observation. In 1897 I used a solution of methylene blue, applied with a swab in such manner as to cover the entire cystoscopic view of the bladder. I thus found that the urine as it escaped from the ureters washed down the coloring matter, and left in the course of its tricklings a paler blue line, or even a line made up of exposed mucosa. At the beginning of this line, at its upper end, was the exact point from which the urine escaped, and necessarily corresponded with the ureteral slits. When the bladder mucosa is so thickened, corrugated, ulcerated, or darkened in color, as is found in some of the more advanced conditions of pathology, I believe that this expedient may be resorted to with great advantage by such as are willing and wish to invade the ureters from the bladder upward, for it certainly greatly facilitates the location of the orifice of the ureters.

I am particular to give the date of my first employment of this aid in the catheterization of the ureters. I have not in any

writings or discussion made mention of this method, and if others have learned the method from me, it must have been from those who assisted or attended at my gynecologic clinics.

Dr. Seth C. Gordon.—I wish to speak of a few cases which I may have reported to this Society before. I removed the kidney of a man which was situated low down in the abdomen, excessively painful, and bound down by adhesions. It caused him so much pain that it was necessary to remove it. He lived eleven days after the operation, and died from uremia. A postmortem examination showed that he had no other kidney.

Two years later I removed the kidney of a woman who evidently had a sarcoma of that organ. However, this operation was done a great many years ago, and in the light of subsequent investigation it may have been a tuberculous kidney. It was very large, and markedly diseased. After the removal of the kidney she lived twenty-eight and a half days—she did not have a single uremic symptom, although not a drop of urine was secreted. She died in the full possession of her faculties. Postmortem examination, made the next day, showed she had no other kidney. I think my experience is somewhat unique in the literature of kidney operations. Kelly says that he has found nothing like it.

Dr. J. Montgomery Baldy.—One of the difficulties in diagnosis which I have met in catheterizing the ureters I have failed to hear anybody refer to. It is not uncommon to have medical men in the wards of the Polyclinic ask me to catheterize the ureters in cases of supposed kidney disease, and not infrequently a perfectly healthy kidney is palpated and found on one side which utterly fails to secrete with the patient under an anesthetic or without it as far as any show from the catheter is concerned. In some instances this failure on the part of the kidney to secrete is undoubtedly brought about by the influence of the anesthetic. At any rate, anesthesia will reduce the quantity of secretion very materially. I have had that same experience a number of times in patients whose ureters I have catheterized, but to whom no anesthetic was given. I would pass a catheter on one side and find the kidney secreting freely, and it was supposedly a diseased kidney. On one side the ureter would be rough and ulcerated upon the bladder aspect, secreting urine, while on the other side there would be a

perfectly healthy kidney, as verified by palpation and by subsequent examinations, with a total lack of secretion, as indicated by the passage of the catheter. After taking all the precautions against the possibility of the catheter not being in the ureter, I am not so confident and cocksure of my diagnosis from catheterization of the ureters alone. It often leaves much to be desired.

Dr. George M. Edebohls.—Some six years ago I wrote a little paper on "The Other Kidney in Contemplated Nephrectomy." This paper was written before we were all experts in ureteral catheterization. I advocated at that time that before a kidney was removed an incision should be made on the opposite side to determine by actual inspection and palpation, first of all, the presence of another kidney; and, secondly, its probable health, so far as could be determined macroscopically. In spite of the advances that have been made in diagnosis in diseases of the kidney, I have adhered to the rule ever since; in all nephrectomies I have performed since that time I have made it a rule to cut down upon the other kidney and to satisfy myself as to its probable condition of health. I have had one case in which this care on my part saved a woman's life. It was a case of abscess of the right kidney, which I opened and drained. The symptoms of pus in the urine reappeared after the kidney wound closed. Cystoscopic examination showed two ureteral orifices, one fairly normal, the other looking inflamed and ulcerated. The bladder was infected, and for that reason no catheter was introduced at the time into the healthy ureter. The urine kept on showing evidences of pus in spite of the constant exhibition of urinary antiseptics, and the pathologist said that the woman's kidney should be removed. I cut down and again found a large accumulation of pus in the right kidney. Nephrectomy appeared to be indicated. I then made an incision upon the opposite side, but found no left kidney. I opened the peritoneum and searched carefully the entire cavity of the abdomen, but could find no trace of a second kidney. Under the circumstances the right kidney was again incised and drained. The woman recovered and is now well from infection of the kidney. Subsequent catheterization of the ureters showed that we could introduce the catheter into the right ureter and draw the urine as usual. On the

eft side, the side on which the kidney was absent, there was a ureter nine inches in length. The catheter could be introduced to this depth, but no matter how long it remained not a drop of urine flowed, thus confirming the diagnosis of solitary kidney.

Dr. J. Riddle Goffe.—As bearing upon the importance of removing the ureter in connection with a tuberculous kidney, I wish to put on record a case that I operated upon in the autumn of 1896. The patient was a woman, aged twenty-two years, who had a tuberculous abscess of the right kidney. I removed the kidney and about three inches of the ureter. She made an excellent recovery, with the exception of a sinus which lasted for four months and then healed. She took up the study of nursing, became a graduate nurse, and has been working at that profession ever since. I saw her a short time ago; she is in excellent health. She is popular as a nurse, and is working hard.

Dr. Edward Reynolds.—I desire to speak on this subject briefly from an experience of ten nephrectomies for tuberculous disease, seven of them having been complete nephroureterectomies. They were all successful so far as the operative mortality is concerned. One of the patients died two years afterward of miliary tuberculosis of the intestines. She was an old tuberculous subject, one who had had pulmonary tuberculosis as well as tuberculosis of the hip and glands of the neck. One other patient, a child, aged thirteen years, after a complete nephroureterecomy, had a recurrence of the tuberculosis in the scar after fifteen months of excellent health. From this she is now recovering. I do not know what it was due to. The other eight have remained well.

I am inclined to believe that operation gives us a better prospect of health in well-established renal tuberculosis than any purely hygienic care which we may give these patients. In my cases hygienic care or open-air treatment has been associated with the preparatory or postoperative treatment, and I believe it to be very important.

I believe it is important always for us to use the ureteral catheter before doing a nephrectomy, both to demonstrate the presence of a second kidney and in order to ascertain the functional activity of that kidney. I have been accustomed to submit the sediment of the urine from each side to inoculation into

guinea-pigs, believing this to be a reliable test. I do not believe in catheterizing the ureters in a case of tuberculosis of the kidney through a tuberculous bladder, and therefore believe in local treatment of the bladder at the first stage in all cases in which it is infected. In the course of my experience I have become a believer in the complete removal of the ureter in all tuberculous cases.

Dr. Vineberg.—With reference to the procedure advised by Dr. Edebohls, namely, to cut down upon the sound kidney, it may be all right in the hands of a skilful and rapid operator, but the majority of men whose experience is not great in this work would hesitate, I think, before they would perform a double operation on a patient who is run down. In those cases in which there has been suppression of urine from inefficiency of the remaining kidney there was no macroscopic appearance which indicated that the kidney was not functionating, and the cause was only found on a microscopic examination; so that if one cuts down and finds an apparently healthy kidney that would be no indication that the kidney was capable of functionating, and the patient might nevertheless die from suppression of urine.

Dr. Harris' ingenious test is a little different from the one I mentioned, in so far as in this instance the injection is given into the gluteal muscles, and the dye coming from the kidney shows its functional activity. I can see one objection to Dr. Harris' test, and that is, very often in these cases of irritable bladder it is difficult to keep the bladder ballooned out for any length of time.

I have not had Dr. Baldy's experience. I have catheterized a hundred or more different patients, many of them for the purpose of demonstrating the method to physicians. I have often catheterized healthy women, and in no case have I found after fifteen or twenty a healthy kidney failed to respond. Sometimes it takes twenty minutes after passing the ureteral catheter before there will be any urine from the kidney. I have catheterized a great many cases in my office without any anesthetic, and have yet to see any bad results. The patients have had no bad symptoms following it. Of course, I do it with the greatest care.

The inoculation test suggested by Dr. Bovée and Dr. Reynolds,

our President, is a very good one, but we have had one experience in the hospital in competent hands in which it has led to error. There was supposed to be tuberculous disease of the kidney from the result of inoculation, and it proved not to be present. Anyone who has had to apply the test in private practice knows how difficult it is. You get a specimen that is collected with the greatest care, and receive a report that the guinea-pig has died from sepsis in two or three days. After you have suggested an operation it is hard to keep these patients waiting for six or eight weeks until the result of the test is known if the disease is at all advanced. I must say that the tuberculin test is one I would not care to employ, because postmortem statistics have shown recently that fully 90 to 95 per cent. of the subjects coming to the dead-room have had tuberculosis in some form at some time, and I would fear that a dormant tuberculosis might be made active. I quite agree with the statement that there is no such thing as true primary tuberculosis of the kidney. The original focus will usually be found in the bronchial or intestinal glands, but after the tubercle bacilli have been carried to the kidney to set up an active process, the original focus may become latent or undergo cure, so that for all practical purposes the disease in the kidney may be considered as primary.

I must take issue with Dr. Bovée in regard to the operative procedure, as I think the operation to do, even in advanced cases, if you have to operate, is to remove the kidney rather than drain in cases of renal tuberculosis.

Dr. Janvrin's case is exceedingly interesting, and it corresponds in some respects with the first case reported by me. I suspected in that case tuberculosis of the kidney. Upon cutting down upon the kidney there was a small abscess situated in its cortex, with a few tubercles scattered over the cortex; still there must have been enough tubercle bacilli to have entered the urine to set up the secondary stricture of the ureter that was present.

PYELITIS COMPLICATING PREGNANCY.

By Edwin B. Cragin, M.D.,
New York City.

The occurrence during pregnancy of a marked rise of temperature with pain and tenderness on the right side of the abdomen is always a source of anxiety to the obstetrician, and its diagnosis and prognosis are matters which deeply concern him.

Although several able articles, by Vinay,[1] Reed,[2] Brigand,[3] Häberlin,[4] and others, have appeared describing the condition it is not generally recognized by either specialist or general practitioner that pyelitis is a not infrequent cause of the above symptoms.

The condition was first accurately described by Reblaud at the Surgical Congress in 1892. That it is not rare in occurrence is evidenced by the fact that during the past winter the writer has met with five cases in private consultation work, and including these has seen ten since September, 1900.

The etiology of the condition seems to depend, according to Vinay, upon two factors: (1) compression of the ureter by the pregnant uterus, and (2) infection of the urinary tract above the point of compression.

1. Compression of the Ureter by the Pregnant Uterus. Experiments upon animals have shown that the

[1] l'Obstétrique, 1899, iv., pp. 230–256.
[2] Philadelphia Medical Journal, December 9, 1899.
[3] Revue Pratique d'Obstétrique et de Pédiatrie, 1901, xiv.
[4] Münchener medizinische Wochenschrift, February 2, 1904.

urine is excreted under low pressure. Ludwig demonstrated that the pressure in the renal pelvis normally does not exceed 10 mm. of mercury. It requires, therefore, but little compression of the ureter to retard the current.

That compression of the ureter with resulting dilatation does occur in pregnancy is proven by the records of autopsies on pregnant women by Stadfeld, Olshausen, Loehlein, and others. Stadfeld in 16 autopsies on pregnant women found 9 dilated ureters. In all the writer's cases and in all the authentic cases of pyelitis in pregnancy which he could find reported the lesion was primarily right sided and usually confined to the right side. Many explanations of this have been given. According to Olshausen,[1] the right ureter is the one most often compressed and dilated in pregnancy. In 16 cases of dilated ureter found by him in autopsies on pregnant women, 12 were unilateral, and of these 12, 10 were right sided and two were left. As causes of the greater compression of the right as compared with the left ureter the following have been suggested:

(1) The greater prominence at the brim of the pelvis of the right over the left common iliac artery exposes the right ureter to greater pressure between the uterus and the iliac artery of that side.

(2) The rotation of the uterus on its long axis from left to right, forward, places the uterus and its contents more in the right oblique diameter of the pelvis than in the left, and thus exerts more pressure upon the right ureter than upon the left.

(3) The greater frequency of the fetal head in the right oblique diameter of the pelvis increases the frequency of pressure upon the right ureter.

In support of this view may be mentioned the fact that in 8 of the writer's cases the position of the fetal head was noted, and in these 8 cases, the head occupied the right

[1] Sammlung klinischer Vorträge. 39. Gynäkologie. Nr. 15, 1892.

oblique diameter in 7; there being 6 in the L. O. A. position and one in the R. O. P.

Theoretically one would expect from the greater tone of the abdominal and uterine walls more compression, and hence more cases of pyelitis, in primigravidæ than in multigravidæ, and that was borne out in my cases, there being 7 primigravidæ and 3 multigravidæ. This is contrary to the experience of Vinay, among whose 9 cases there were only 2 primigravidæ and 7 multigravidæ.

2. Infection of the Urinary Tract above the Point of Compression. From the frequent appearance of the bacillus typhosus in the urine of typhoid fever patients and from experiments on animals it would seem that in many infective processes the organisms may be eliminated by the urine without appreciable injury to the urinary tract, provided this tract is in no way obstructed. On the other hand, the experiments of Reblaud and Bonneau on animals show that after an aseptic ligature of the ureter the injection into a distant part of the body of either streptococci or colon bacilli can produce a pyonephrosis, it being a descending infection. Hence, with a ureter compressed by the pregnant uterus, the infection of it and the renal pelvis is favored. The infecting organism in the pyelitis of pregnancy is usually the colon bacillus. This was the organism found in three of my cases, the only ones in which the urine was examined bacteriologically, and has been found to be the infecting organism in all reported cases examined bacteriologically with two exceptions—one by Vinay, in which the streptococcus was found, and one by Lop which showed the gonococcus.

The period of pregnancy at which the pyelitis is most likely to occur is between five and eight months. In all but one of my 10 cases the attack appeared at that time. In 3 it occurred at five months; in 2 at six months; in 3 at seven months; in 1 at eight months, and in 1 at term.

During the last two years I have also met with three

cases of pyelitis developing during the puerperium. These were probably of the same origin as those occurring during pregnancy, and recovered under the same treatment; but as no bacteriologic examination of the urine was made, and as ascending infection could not be positively excluded, they are not included in the present discussion.

The general course of pyelitis in pregnancy may be seen from the following brief abstracts of cases which have come under my observation:

Case I.—Mrs. F. G., aged twenty-five years, IV-gravida. Admitted to the Sloane Maternity Hospital September 13, 1900. For five weeks previous to admission she had suffered with frequent and painful micturition, and for the last three weeks with pain in the right lumbar region, increased by coughing or other motion. For the week previous to admission, there had been a rigor each morning, followed by fever, sweating, and headache. On the day following admission her temperature was 102.6°, and there was tenderness over the right kidney. Her urine was acid and contained many pus and epithelial cells. She was delivered of a full-term child September 15, two days after admission. Position of child L. O. A. On the day following delivery the afternoon temperature was 103.8°. She was given urotropin, gr. v q. 4 h., and on the fifth day the temperature came to normal and remained so thereafter. The urine gradually became clear. Her highest temperature while in the hospital was 103.8°. It remained above 100° for four days.

Case II.—Mrs. L., aged twenty-three years, primigravida. Admitted to the Sloane Maternity Hospital August 31, 1901. She was in the seventh month of pregnancy, anemic, and complained of pain over the right side of the abdomen. Her urine showed pus cells and a trace of albumin. Her temperature on admission was 102.8°. She was given cystogen, gr. v q. 4 h., fluid diet, and large draughts of water. Her temperature and tenderness over the right kidney subsided in four days and the urine gradually cleared.

Her highest temperature was 102.8°. It remained above 100° four days. She was normally delivered November 11, 1901, and made a good convalescence. The position of the child was L. O. A.

Case III.—Mrs. M. G., aged twenty-three years, III-gravida. Admitted to the Sloane Maternity Hospital September 19, 1901, complaining of severe pain in the right lumbar region. Her pregnancy was seven months advanced, and she stated that she had had fever in the afternoon for several days. Her urine was acid and showed pus and epithelial cells. There was a trace of albumin. Her temperature on admission was 102.8°. She was given cystogen, gr. v t. i. d., milk diet, and large draughts of water. Her temperature reached normal on the eighth day, and remained so thereafter, the urine gradually clearing. Her highest temperature while in the hospital was 104°. Her temperature remained above 100° for seven days. She was normally delivered two months later. Position of child L. O. A. Her puerperal temperature did not reach 99°.

Case IV.—Mrs. M. H., aged thirty-seven years, XIII-gravida. Admitted to the Sloane Maternity Hospital April 20, 1903, complaining of sharp pain over the right kidney. Her urine was acid and contained pus and epithelial cells. Her pregnancy was seven months advanced. By May 12th the pain had ceased and the urine was nearly clear. At no time during her stay in the hospital did she show any rise of temperature above 100°. The position of the child was R. O. A.

Case V.—Mrs. D., aged twenty-four years, native of the United States, primigravida. Admitted to the Sloane Maternity Hospital May 18, 1903, stating that for two days she had suffered from pain in the right lumbar region and fever. On admission her temperature was 102.4°. Her urine was acid and showed pus and epithelial cells. Her leukocytes numbered 22,000. She was delivered of a full-term child on the day following admission. Position

of child R. O. P., rotating to R. O. A. In spite of cystogen, gr. v t. i. d., ice-bags to the kidney, fluid diet, and large draughts of water, the patient gradually grew worse, and on June 3d the right kidney was removed by Dr. Joseph A. Blake. The kidney showed several small abscesses in its substance, and bacteriologic examination showed the colon bacillus. After a tedious convalescence the patient completely recovered. Her highest temperature previous to the nephrectomy was 104°. Her temperature prior to the nephrectomy was above 100° for sixteen days.

Case VI.—Mrs. M. G., primigravida, seen in consultation with Dr. Palmer A. Potter, of East Orange, N. J., October 14, 1903. Her pregnancy was five months advanced. She had had an irregular fever for several days, with an occasional epistaxis. Her temperature when I saw her was 104°. For three days prior to my visit she had complained of pain in the right lumbar region. The case looked a good deal like typhoid fever, and that was my first probable diagnosis. The Widal test, however, was negative, and subsequent examination of the urine showed it to be acid, with pus cells renal epithelium, bacteria, and a trace of albumin. She was given urotropin, gr. v 4 i. d., fluid diet, and large draughts of water. On the third day following the commencement of the urotropin the temperature came to normal and remained so thereafter. Her highest temperature was 104°. Her temperature remained above 100° for nine days. The urine gradually cleared. She subsequently went to term and was delivered of a living child. Puerperium normal.

Case VII.—Mrs. G., aged twenty-six years, primigravida, seen in consultation with Dr. George E. Steel, of New York, December 13, 1903. She was six months pregnant, and for forty-eight hours had been complaining of pain on the right side of the abdomen in the region of the vermiform appendix. Her temperature was 102°, pulse 130. The site of greatest tenderness was near the McBurney point. It looked like a case of appendicitis, and that was my probable

diagnosis on my first visit. Examination of the urine next day, however, showed it to be acid and to contain pus cells, hyaline casts, and albumin. Previous to the attack of pain, the urine had been normal. The diagnosis was changed to that of pyelitis, and she was given urotropin, gr. v 4 i. d., with fluid diet, large draughts of water, and an ice-bag over the right kidney. Her pain and temperature subsided in three days, and she made a speedy recovery, although the urine showed pus cells and casts for more than a month. Her highest temperature was 102°, highest pulse 130; the temperature remained above 100° for four days. She was delivered at term, March 10, 1904. Position, L.O.A. Puerperium normal.

Case VIII.—Mrs. C., aged twenty-seven years, primigravida, seen in consultation with Drs. C. T. Adams and F. F. Ward, of New York, March 4, 1904. She was five months pregnant, and for the month previous had complained of pain and tenderness on the right side of the abdomen, especially in the region of the right kidney, which could be felt enlarged and tender. Her temperature during the month prior to my visit had been a varied one, ranging from normal to 104° with intermissions of several days when the temperature was normal. No malarial organisms were found and the Widal test was negative. Her urine was acid and contained pus cells, a trace of albumin, and a few hyaline casts. The diagnosis of pyelitis was made and she was given urotropin, fluid diet, and large draughts of water with an ice-bag over the right kidney. Her temperature and pain subsided in two weeks after beginning the urotropin, but the urine contained pus for a month longer. Her highest temperature was 104°, highest pulse 118. Her temperature was above 100° for sixteen days. She is now progressing normally in her pregnancy.

Case IX.—Mrs. P., aged twenty-four years, primigravida, seen in consultation with Dr. D. E. O'Neil, of New York, April 10, 1904. She was about six months pregnant and

for three weeks had been complaining of pain on the right side of her abdomen. She had had several slight rigors. Her micturition had been frequent and painful. On examination her right kidney was found enlarged and tender. Her urine was acid and contained considerable pus. The filtered specimen showed no albumin. Cultures from a catheterized specimen showed the colon bacillus. She was given urotropin, gr. v-4 i. d., with fluid diet and large draughts of water. Her temperature and pain subsided in about ten days after beginning the urotropin. She is now progressing normally in her pregnancy, but the urine still contains a little pus. The position of the child is L. O. A.

Case X.—Mrs. B., aged twenty-eight years, primigravida, seen in consultation with Dr. Edwin Sternberger, of New York, April 29, 1904. She was about five months pregnant, and for two days had been complaining of pain on the right side of the abdomen, especially in the appendicular region and in the back. This pain at times was intense. Her urine was acid, contained a trace of albumin, considerable pus, and the bacteriologic examination showed abundant colon bacilli. Her right kidney could be palpated, was enlarged and tender. For several days her pain was much worse every other day.

On May 10 her leukocytes were 14,400; red cells, 4,120,000; urea, 296 grains. May 16, leukocytes, 16,000. From April 27 to May 6, in spite of the pain in the region of the right kidney and ureter, the temperature did not rise above 100.4°. On May 7 the temperature reached 101.2°, and on May 10 104°. For the next three days she became progressively worse, her temperature on the evening of May 13 reaching 105.6°, and it seemed to me that operative interference would be demanded on the following day. The next morning, however, found the patient better, and under the advice of Dr. Willy Meyer, of New York, operative interference was postponed. The patient steadily improved, the temperature reaching normal in four days. This case has been char-

acterized by more pain than any of the others under the observation of the writer. Opiates in some form have been frequently required. Her highest temperature was 105.6°. It remained above 100° for seventeen days. The temperature at the time of writing is normal, but the pain, although less severe, has not entirely disappeared. Aside from opiates for the relief of pain, her chief treatment has been urotropin or its allied drugs, fluid diet, and large draughts of water.[1]

From the above cases the symptom-group can fairly well be pictured.

Pain in the lumbar region sometimes very acute, sometimes only elicited by palpation or motion. The pain often follows the course of the ureter from kidney to bladder. *A rise of temperature*, usually quite high at some time during the attack, 102° to 105°, although in one of my cases (Case IV.) the temperature did not reach 100°. In cases with high temperature rigors are not infrequent.

Irritability of the bladder with frequent and painful micturition is common, but the infection is a descending one, and the cystitis, when it does occur, is usually secondary to the pyelitis and ureteritis. *The right kidney can usually be made out enlarged and tender. The urine is acid, at first may contain only a trace of albumin and perhaps a few casts, to be soon followed by pus cells, renal epithelium, and bacteria.* The filtered urine often shows no albumin. The pus cells are usually more abundant as the pain and temperature subside. The urine often contains pus cells for a month or more after the constitutional symptoms have disappeared.

One of the features of chief interest in pyelitis complicating pregnancy is the diagnosis. In many cases this is easy if

[1] After the reading of the above paper, Case X. had a recurrence of fever, with an increase of all unfavorable symptoms. As the pregnancy was then about eight months advanced and the renal symptoms were increasing, the uterus was emptied by her family physician. The renal symptoms soon subsided. There was a slight recurrence about a month later, but it was of short duration. No further trouble. The child lived and throve.

the possibility of the condition is borne in mind. Pain and tenderness in the region of the kidney, a rise of temperature, and an acid urine containing pus may point at once to the diagnosis of pyelitis. On the other hand, it must be remembered that when an abdomen is occupied by a uterus pregnant from five to eight months the palpation of the other abdominal organs is often difficult. Furthermore, there are other conditions which may give symptoms resembling it. The three conditions most likely to be confused with pyelitis in pregnancy are, judging from the writer's experience, appendicitis, typhoid fever, and salpingitis.

In some of my cases, especially Cases VII. and X., the point of greatest tenderness has corresponded closely with the McBurney point, and appendicitis has been strongly suggested. In each of these cases the diagnosis was made from the condition of the urine. The reason for the point of tenderness corresponding with the McBurney point seemed to be that pressure at this point forced the uterus back against the ureter and thus increased the pain. The leukocyte count in these cases of pyelitis resembling appendicitis has seemed to the writer lower than one would expect in an appendicitis case correspondingly ill.

In Case VI. the irregular fever and the epistaxis resembled typhoid fever, and it was only after the negative Widal test, the explanation of the epistaxis by the amenorrhea of pregnancy, and the examination of the urine, that the correct diagnosis was made.

The differential diagnosis between pyelitis and salpingitis can usually be made by the history, the bimanual examination, and the careful examination of the urine.

From the above cases it will be seen that the chief aid to the diagnosis of pyelitis in pregnancy is the careful examination of the urine; chemical, microscopic, and bacteriologic.

Although the pain may be very severe and the temperature high, even 104° or 105° for a few days, the prognosis of pyelitis complicating pregnancy is usually good. With the

exception of Case V., in which the pyelitis started at term and in which the substance of the kidney was infected as well as its pelvis, all the cases of my series recovered under medical treatment, the temperature and pulse subsiding to normal in from four to thirty days; the urinary changes perhaps persisting for a month more.

Judging from my own cases and from the reported experience of other observers, if the kidneys have previously been healthy, pyelitis complicating a pregnancy of from five to eight months' advancement, which is the usual period of the complication, justifies a favorable prognosis of complete recovery under medical treatment.

In a few cases, however, there are recurrences during the pregnancy, and the possibility of a pyelitis becoming a pyelonephritis, as occurred in Case V., just referred to, must not be lost sight of. This latter possibility seems more likely the nearer the complication approaches full term and the puerperium.

The medical treatment which the writer has employed in all the cases under his observation is as follows: Rest in bed; fluid diet, especially milk; large draughts of water; urotropin, or its ally cystogen, gr. v 3 or 4 times a day; ice-bag over the kidney, and, if this fails to relieve the pain, an occasional opiate. In many cases, saline catharsis has given marked relief. If, in spite of this treatment, there is evidence of extension of the infection to the kidney substance, surgical interference by nephrotomy or nephrectomy is indicated.

Interruption of the pregnancy is seldom, if ever, necessary or advisable.

DISCUSSION.

Dr. Robert L. Dickinson.—In this admirable presentation of a subject that is relatively new and not understood in general by the profession, there is but one feature omitted, and that is the fact that these patients are severely ill. The family physi-

cian is gravely alarmed. The patient suffers, has high temperature, has severe abdominal pain, whether it be in the fifth month or later. Most of the cases I have seen in consultation have been early ones, in which there was not only severe pain, but some flatulent distention suggestive of peritoneal involvement. In at least three antepartum cases under observation the pain was more prominent near the crest of the ilium than it was in the back. In three of the cases a diagnosis of appendicitis was given by the family before consultation. These cases have cleared up just about the time that an operation was thought to be inevitable. Of two cases seen postpartum, one in the wife of an obstetrician, and who was delivered by one of our most skilled obstetricians, there could not have been any ascending infection nor any symptoms of trouble before delivery. The other case was catheterized by skilful nurses, but the infection was so rapid that it is probable there was a preliminary cystitis, with an ascending ureteritis.

It is high time that the attention of the profession hould be drawn by such an excellent paper as that of Dr. Cragin to a disease long overlooked.

Dr. Charles P. Noble.—I think the paper of Dr. Cragin is valuable and timely, and I have been very much interested to find that his larger experience corresponds with what I have observed. Only a few days ago I asked Dr. Kelly what his experience had been, and asked him if he had ever written anything about it, because, as a matter of fact, very little has been written about it. The cases of pyelitis complicating pregnancy, I have seen, correspond with the description Dr. Cragin has given, and they have recovered under the same treatment, minus urotropin, keeping them in bed, and giving them enough water to void sixty ounces of urine daily.

As this is a relatively new subject for discussion, I think by analogy we might say something about pyelitis in the non-pregnant woman. My experience with acute pyelitis in the non-pregnant woman has been similar. Where it was not due to tuberculosis or stone, all of the cases ended in spontaneous recovery by keeping them in bed and giving them plenty of water. That is the only treatment I have ever used, and they have all recovered. Within the last two months I have had four cases that made good recoveries under this plan of treatment.

So far as my observations are concerned, I would like to say a word or two in reference to the diagnosis. In the beginning in most of my cases there has been very little pus in the urine. As long as they had fever there was but little discharge of pus from the pelvis of the kidney. When the pus discharged freely the fever subsided. That is a point of much value in the diagnosis in addition to what Dr. Cragin has said.

So far as the differential diagnosis is concerned there is no doubt these cases are oftentime very easily confused with appendicitis. As a matter of fact, one of the four cases recently under my care was diagnosed as an acute appendicitis by an excellent physician. The patient was acutely ill. I operated without making a urinary examination, and removed a normal appendix. The patient got well from the acute pyelitis while recovering from the abdominal section. Another of the four cases under my care was sent to me with a diagnosis of appendicitis. I made a correct diagnosis, and she is now getting well without having had an abdominal section.

Dr. Edward P. Davis.—I have seen a number of cases of pyelitis complicating pregnancy, and clinically most of them have coincided closely with those described by Dr. Cragin; but I have seen two in which the symptoms differed considerably. One occurred in the puerperal period, eight weeks after a difficult delivery by version through a contracted pelvis, and in this case the left instead of the right kidney was involved. In the other case for some time considerable doubt existed as to the diagnosis between a disordered kidney and infection of the gall-bladder. The pain, apparently obscure, referable to the right quadrant of the abdomen, radiated backward and deeply toward the loin, and a final diagnosis of mild infection of the gall-bladder being made certain by repeated examinations of the urine, restriction of diet was advised and cold applications made over the region of the gall-bladder rather than the kidney. At first the symptoms were closely allied to those described by Dr. Cragin. I do not think we should ascribe too much importance to the localization of this condition. These cases do not have a localized disease of the kidney, but they are a part of a common infection with the colon bacillus characteristic of the condition which often attacks the entire excretory apparatus of pregnant women, and one reason for the success of the treatment

in these cases lies in the limitation of diet, unloading the intestines, the free use of water, and the establishment of those conditions which bring about the free discharge of colon bacilli from the bowel as well as from the kidney. If we study the cases of obstinate constipation in pregnant women, intestinal toxemia, and of pyelitis, we will come to the conclusion that the pregnant woman is very susceptible to infection with the colon bacillus.

Dr. Lapthorn Smith.—I desire to add a few words on this subject of pyelitis complicating pregnancy. In many of these cases the urine is very acid; it contains albumin and a few casts, followed sooner or later by the presence of pus and bacteria. As Dr. Davis has said, the pregnant woman is especially liable to infection by the colon bacillus. And why are the ureters and kidneys especially liable to infection? Because they are irritated. Their circulation is lowered by the constant highly concentrated urine. During the early months of pregnancy these women do not drink enough water. Vomiting of pregnancy is of common occurrence, and they cannot keep the water down; consequently it is well for us to supply water by giving them salt solution by enema. For my own part, when I have to attend these women I at once put them on laxatives, and alkalinize and dilute the poisonous material by giving them several tumblerfuls of water a day, and very soon the pain and symptoms of which they complain disappear. I do not place so much stress on pressure on the ureters, for every pregnant woman has pressure on the ureters. I think the condition is a general rather than a local one.

I want to emphasize the value of the use of urotropin in infections of the bladder and kidneys. Of the hundreds of new drugs we have had described and put on the market this is one of the few that is of value in clearing up infected urine. I have found it eminently satisfactory in the cases in which I have used it.

Dr. Henry D. Fry.—I do not like the explanation given in accounting for the frequency of the right pelvis of the kidney being affected. If the disease were more common in the latter months of pregnancy, or the last two months, I would be willing to accept the explanation that the pyelitis was due to pressure on the right ureter and to the fact that the fetal head is more frequently in the right oblique diameter of the pelvis; but the essayist states that in the majority of cases it is met with

in the second semester. In the last two or three months of pregnancy the fetal head could produce pressure on the ureter, particularly in a primipara. In a primipara, owing to increased intra-abdominal pressure, the head of the child is forced down to the pelvic cavity, and with it in the oblique diameter it would press on the right ureter. In the multipara the fetal head is raised up by the iliac fossæ. If that were the cause the explanation would be satisfactory, but if the majority of cases occur in the second semester I do not see how the position of the fetus can have anything to do with it. The position of the fetus is not fixed at this time. The fetus does not remain in any one position for any length of time, and even if it did I do not see how it would press on the right ureter.

Dr. Howard A. Kelly.—I feel that the explanation of Dr. Fry is not only a satisfactory one, but I am inclined to attribute a great deal of importance to antecedent movable kidney so frequently seen on the right side, with some blocking up of the ureter. I have seen many cases (I cannot recall how many), two of which came to operation. In one I extirpated the kidney and found multiple purulent foci through the substance of the kidney. Labor was brought on in the seventh month. The woman had infection of the opposite pelvis of the kidney, which I treated some years subsequently before giving relief. Both sides were affected in that case.

In another case, a Jewish woman, I extirpated one-fourth of the right kidney, suturing the rest of the kidney, and she recovered nicely, went on to term, was delivered with the remaining kidney and what remained of the one resected. Not all of these cases go on quite so satisfactorily to spontaneous recovery, even under careful treatment.

Dr. J. Clarence Webster.—If I understood Dr. Cragin rightly, he stated that the induction of labor is seldom indicated in cases of pyelitis. I would like to ask him if he thinks it might be indicated in such a case as the following:

About two months ago I saw an interesting case of this kind in which there was a large swelling of the kidney, containing pus. It was four or five inches in diameter. The woman was seven or eight months pregnant. The question arose as to what to do, whether to evacuate the pus or remove the kidney, whether the pregnancy should be allowed to take its course or

to interrupt pregnancy and attend to the kidney at a later period. I gave as my opinion that the latter course should be followed. I did so for the reason that if drainage of the kidney had been carried out, the suppurating wound might lead to sepsis after labor, whether the latter occurred immediately or at full term. Of course, the latter risk might be avoided by removing the kidney, but such a radical measure should be avoided if possible.

I have learned that my suggestion was carried out, and that after the induction of labor, the kidney condition made a rapid improvement, no operation being necessary.

I have given considerable attention to the relationship of the pregnant uterus to the ureters in connection with the subject of eclampsia. Halbertsma first stated that the pressure of the pregnant uterus is a causal factor, while Ries in succeeding, referred especially to the pressure of the fetal head. While it is possible that these factors have something to do with some cases of eclampsia, it seems to me that Dr. Fry's criticism is quite justifiable, viz., that, except in very late pregnancy it is difficult to understand how the fetal head or uterus should cause deleterious pressure upon the ureter.

Dr. Hiram N. Vineberg.—I wish to relate an interesting experience in connection with this subject of puerperal complicating pregnancy. Three or four years ago a young woman, in perfect health, pregnant about five months, was taken ill with obscure symptoms of indigestion. The urine was examined a short time before and found normal, but within a few days she had distinct signs of acute nephritis of pregnancy. She had a small amount of smoky urine, a high percentage of albumin and casts in it. I emptied the uterus, after which the nephritis improved, but a pyelitis developed, and for months there was pus in the urine. I would like to ask Dr. Cragin if any of his cases of acute nephritis complicating pregnancy presented such a picture. This was a classic case of nephritis of pregnancy followed by pyelitis.

In reference to the diagnosis, during the past two years I have had four cases with obscure symptoms complicating pregnancy at various periods, from the fourth to the eighth month, and in all cases, excepting one, a diagnosis of appendicitis was made by several consultants, and in three cases I removed practically

a normal appendix after various consultations. The patients went on from bad to worse until the uterus was emptied. In all the cases there were no urinary complications. In one case there was a dead fetus, and I thought afterward the infection might have come from the uterus. The symptoms were those of peritonitis, with pain in the right side, and there was no improvement in the patient's condition until the uterus was emptied, after which recovery was rapid and satisfactory.

DR. CRAGIN.—I am very much obliged to the Fellows for a free expression of their opinions. In the main they agree with mine. I shall endeavor to answer the few questions that have been asked in their order, and, first, with reference to Dr. Dickinson's experience in postpartum cases. I have had the same experience. In one, a forceps case, I took a catheter directly from a sterilized package, introduced it into the urethra, with the urethra entirely exposed, and delivered the woman with forceps. This was followed by pyelitis. The infection, I think, was descending, although I could not positively exclude an ascending infection. I purposely omitted pyelitis of the puerperium from my paper, thinking it would make it too long. I tried to confine the discussion to pyelitis complicating pregnancy, in which it is so confusing.

In regard to the remarks of Dr. Noble, that water will answer as well as water plus urotropin, I treated one of my cases with water without urotropin. She recovered, but comparing that case with the others which had pus in the urine, it seemed to me that the pus cleared up more rapidly in the cases that had urotropin than it did in the one which had been given water alone. That is my reason for giving water plus urotropin.

In regard to Dr. Davis' experience of the left kidney being involved during the puerperium, in one of my cases in the puerperium there was involvement of the left kidney, but the right was the one most involved, the left kidney being involved secondarily by infection coming down the right ureter into the bladder and extending to the left kidney, but not to a severe degree.

The criticism about the etiology is perfectly just. I do not feel in my own mind that we know the exact etiology. The pressure on the ureter, I think, is purely a predisposing cause, and makes it a little more vulnerable. That the ureter on

the right side is more compressed than the left is proven by autopsies on pregnant women, and this makes the right side a little more vulnerable than the left. We see that in movable kidney. We do not know exactly why the right kidney is so much more frequently movable than the left. The right kidney seems in general to be the more vulnerable kidney, and the right common iliac artery being the more prominent, compressing the right ureter between it and the pregnant uterus, and the uterus, although small, lying in the right oblique diameter more often than otherwise, are factors which make the pressure a little greater on the right side than on the left, and being a little greater it increases the vulnerability of this side, and makes it more liable to infection.

In regard to the remarks of Dr. Webster, I sympathize with him most fully. I have a case now in which I am acting as consultant in which the question of induction of labor has come up several times. I have decided in the negative in my case for the reason that I have had cases in which the kidney had to be removed, and they were both cases in the puerperium, in one of which the pyelitis occurred only two days before delivery. In other words, in spite of the delivery, in one case the pyelitis became worse, and the woman finally had to have the kidney removed. In the other the pyelitis began during the puerperium. That being so, I was afraid if I emptied the uterus the woman would still have a pyelitis, and as a final process I would have to operate on the kidney, thus adding extra shock to the delivery of the woman. Further than that, one naturally bases his judgment on experience, and when one has had nine cases, all of them between five and eight months pregnant, recover without operation and without the induction of labor, he feels inclined not to operate in the way of induction of labor or operation on the kidney unless symptoms are steadily increasing and the woman shows she is getting near the brink. Personally, I do not believe that the induction of labor will often be demanded, and the lack of improvement after emptying the uterus has seemed to justify the conclusion from my experience in these cases that it is wiser to treat them medically than to empty the uterus.

A SECOND CASE OF PUERPERAL ECLAMPSIA SUCCESSFULLY TREATED BY RENAL DECAPSULATION.

By George M. Edebohls, M.D.,
New York City.

A year ago I had the honor of presenting for your consideration a report of the first case of renal decapsulation for puerperal eclampsia. The account of this first case, as published in the New York *Medical Journal* of June 6, 1903, may be epitomized as follows: Primipara, aged twenty-three. Typhoid fever during the fourth month of pregnancy. Symptoms of nephritis first noted during the seventh month. Uremia and eclamptic seizures near the end of the eighth month. Five severe convulsions within sixteen hours, followed by forced delivery during fifth convulsion. Freedom from convulsions for forty-six hours after delivery. Then return of convulsions, six severe convulsions, not counting minor manifestations, occurring in eighteen hours. Decapsulation of both kidneys. No further convulsions, and rapid restoration of complete health.

I may add that I have seen the patient within the present month (May, 1904), and that she enjoys perfect health, with urine free from albumin and casts, fifteen months after operation.

In presenting the case I concluded with the following remarks: "The practical deduction from the happy result obtained is that we possess in renal decapsulation an additional potent resource in the treatment of puerperal eclampsia

of renal origin." Personally, I should not hesitate to apply it again in a similar instance. I would even go farther and propose a trial of renal decapsulation in puerperal convulsions of nephritic origin occurring prior to the beginning of labor. The mother would certainly be benefited, and the occurrence of premature delivery or the necessity of inducing it might possibly be averted.

On the first day of the present year the opportunity presented, and was embraced, of performing renal decapsulation for puerperal eclampsia upon the undelivered woman. The result is recorded in the following history of the case:

On January 1, 1904, I was asked by Dr. N. R. Dann to aid him in a case of puerperal convulsions. The patient, W. N., a primipara, aged twenty years, was married on February 2, 1903, menstruated last on April 4, 1903, and expected to be confined on January 9, 1904. Pregnancy progressed smoothly until the occurrence of vulvar pruritus in November, 1903. Examination of the urine made by Dr. Dann at the date last named gave normal results, neither albumin nor sugar being present. On December 20, 1903, the patient complained of specks before the eyes and dizziness. The urine was again examined and found to contain a trace of albumin. On December 28, 1903, edema of the feet, puffiness of the eyelids, beginning coma, and total blindness supervened. The dropsy increased, the coma deepened, and the patient remained blind until January 1, 1904, on which day at 10 A.M. the first convulsive twitching occurred. An hour later I saw the patient with Dr. Dann, who had exhausted all the usual resources in attempts to dispel or lessen the uremia.

The patient's mental condition varied between stupid semiconsciousness and muttering, active delirium. She was totally blind, with labored breathing, full, soft pulse, and temperature but slightly above the normal. The abdomen was of unusually large size even for a nine months' gestation;

the dimensions of the patient were suggestive of hydramnios or twins. The lower extremities, the abdominal walls, and the back were dropsical in the extreme, while the upper extremities and face were only slightly edematous. Fetal movements, though not vigorous, could be plainly felt, and the fetal heart sounds were clear, distinct, and regular. The cervix was tightly closed and there was not the slightest indication of beginning labor. During the twenty-four hours preceding my first visit the patient had voided in all 360 c.c. of urine containing four-tenths of 1 per cent. of urea, making a total output of only 1.44 gm. of urea in twenty-four hours. During our examination a second general twitching occurred.

Renal decapsulation was offered the family and friends of the comatose patient as the most certain, prompt, and efficacious measure to increase the urea output, and thus to avert impending death from uremia. The offer was accepted, and hurried preparations were at once made for operation at the home of the patient.

The operation was performed on January 1, 1904, at 11.30 A.M., Dr. Thomas L. Bennett administering chloroform and Drs. W. G. Vincent and S. W. Adams assisting. On account of the enormous size of the abdomen, and of the danger of injuring the fetus by pressure, the lateral decubitus was the only position available. The left kidney was first operated upon, the patient lying on the right side. The extreme dropsy of the back, by increasing the depth of the wounds, and the convulsive twitchings of the patient even under chloroform made the work rather more difficult than usual. The left kidney was increased in volume to about 50 per cent. above the normal. The capsule proper was found thick, strong, and loosely gathered or wrapped around the kidney. It was so loose indeed as to be slightly corrugated, and it could be pinched up in folds. There was no bleeding, not even oozing, from the kidney surface on stripping off the capsule, although the hemorrhage in cutting through the abdominal parietes had been unusually free.

This hemorrhage, by the way, was purposely encouraged, and was only checked when it was judged that a sufficient amount of blood had been lost to confer on the patient the benefits of a moderate venesection. The capsule was separated from the kidney over the entire surface of the latter, and was excised *in toto*. The kidney surface after removal of the capsule presented everywhere a dirty-gray, turbid, sluggish, and stagnant appearance, the entire organ being choked with inflammatory exudate.

After completion of operation upon the left kidney the patient was turned upon the left side, the right lumbar region was rendered aseptic, and incision was made down upon the right kidney. The right kidney and its capsule were found in identical condition with that recorded for the left kidney, except that the right kidney was not quite as large as the left. Operation upon the right side was easier than on the left, the right kidney being readily delivered well into the wound, while the left kidney which could not be so delivered had proved more difficult of access. The operation upon the left kidney required fifteen and that upon the right fourteen minutes. Altogether, including the time required for washings and posturings, the patient was under the anesthetic for forty-five minutes. At the conclusion of operation the patient was returned to bed in good condition. The operative diagnosis was right and left acute or subacute parenchymatous nephritis.

During the twenty-four hours following operation there was almost complete suppression of urine, only 30 c.c. of gelatinous, semisolid, coffee-colored urine being obtained by catheter. Notwithstanding this, the patient's condition changed visibly for the better. During the same twenty-four hours of suppression following operation, the general restlessness and delirium disappeared, there were no further twitchings or convulsions, sight was restored following four days of total blindness, and the patient was able to recognize those around her. At the end of twenty-four hours after

operation the urine began to flow freely, 1000 c.c. being drawn by catheter and a great deal more being voided into bed during the second twenty-four hours following operation, while the improvement of the patient's general symptoms became more and more marked and her condition no longer gave rise to immediate anxiety.

The next event of importance was the spontaneous commencement of labor forty-eight hours after operation. The beginning of cervical dilatation at 10 A.M. of January 3, 1904, was marked by a slight convulsion quickly controlled by chloroform. At 10.30 A.M. and at 11 A.M. two further slight twitchings, the last in the history of the case, occurred. They were regarded as the response of the nervous system, still very susceptible by reason of uremic intoxication, to the ushering in of the parturient act. They gave rise to no anxiety, as the patient's condition was otherwise satisfactory. At 1 P.M., the fetal heart sounds having all along remained distinct, and the cervix having spontaneously dilated to a sufficient degree, the forceps were applied to the presenting head, and a male child weighing 2640 c.c. was delivered. The partly asphyxiated child was revived by assiduous work on the part of Dr. Dann. An examination of the woman now showed a second head presenting. The fetal heart sounds remained clear. After a short period of rest for the mother and a little time granted for spontaneous birth, it was thought advisable in the interests of the second child to deliver. The forceps were applied to the head of the second child, and delivery was effected at about 3 P.M. The second child, of the same sex and weight as the first, was born alive, but breathed only a few times after its birth, all efforts at resuscitation failing. The two placentæ were next delivered, after which the uterus contracted firmly and satisfactorily. The dressings of the lumbar wounds, which had become disarranged during labor and as a consequence of the immense shrinkage in size of the abdomen, were changed and the patient was allowed a much-needed rest. She slept

a natural sleep for the greater part of the twenty-four hours after delivery, and awoke a changed, bright woman, in full possession of all her faculties.

The further progress of the case was uneventful. There was no recurrence of twitchings or of any unfavorable symptom, and the remaining edema rapidly disappeared. During the four or five days immediately following delivery a perfect deluge of urine, loaded with casts of all kinds, and containing albumin in quantities varying between 0.05 and 0.6 per cent., came down from the kidneys. The urine, mixed with blood and the lochial discharges, was not in favorable condition for satisfactory examination. Much of the urine also was lost with the fecal discharges, which were abundant and frequent for some days. The exact daily amount of urine, therefore, could not be determined with anything like precision. Three days after operation, from January 5 to 6, the amount of urine voided in twenty-four hours, as estimated by the nurse, was not less than 6800 c.c. One uncontaminated specimen of no less than 1680 c.c., obtained at a single catheterization on January 6, was submitted to careful analysis, with the following result: specific gravity, 1016; total solids in this one voiding, 60.63 gm.; urea, 1.3 per cent.; total urea, in one voiding, 21.84 gm.; albumin, 0.6 per cent.; numerous hyaline, epitheliated, fine and coarse granular casts, many of the latter with fat droplets; a few waxy, epithelial, blood and mixed casts; numerous isolated red blood cells; moderately frequent leukocytes; numerous renal cells.

The output of solids and of urea during the first days after operation was simply enormous. Presuming that the specific gravity and the urea percentage above noted for a single voiding apply to the entire quantity estimated to have been passed during the third day after operation, we have an output for the third twenty-four hours after operation of no less than 253.5 gm. of solids and of 88.4 gm. of urea. By the end of a week after operation the daily excretion

of solids and urea had gradually returned to about the normal. Owing to the presence of the lochial discharges and to unwillingness to draw all of the urine by catheter, a full and valid twenty-four hours' specimen of urine was not obtained for examination until January 14. Prior examinations of single voidings obtained by catheter showed a steady diminution from day to day of the amount of albumin and of the number and variety of casts. Examination of a full twenty-four hours' specimen, made January 14, 1904, gave the following result: total quantity of urine, 5000 c.c.; specific gravity, 1011; total solids, 128.15 gm.; urea, 0.3 per cent.; total urea, 15 gm.; albumin, a marked trace; sugar, none; casts: occasional hyaline and granular, rarely waxy; red and white cells, due to contamination with lochia.

On January 31, 1904, the total amount of urine was 1700 c.c.; specific gravity, 1015; total solids, 59.42 gm.; total urea, 11.9 gm.; albumin, a faint trace; rarely a hyaline cast; a few mucous cylindroids; no renal elements; still some lochial cells. An examination, made April 9, 1904, showed the urine to be practically normal; no albumin, no casts, a few mucous cylindroids, no renal elements.

The progress of improvement in the patient's general condition kept pace with that of the urine. At no time after delivery was there any cause for anxiety. The puerperium ran a normal course. Both lumbar incisions healed by primary union throughout, in spite of much unavoidable disturbance of the dressings during labor and immediately afterward. Three weeks after operation the patient left her bed, and a week later resumed her duties in life.

Last report, May 14, 1904, four and a half months after operation. Patient has nursed her child continuously from its birth to date of report. Mother and child are enjoying most excellent health; the child weighs 9½ kg. Examination of the mother's urine gives the following results: total quantity voided in twenty-four hours, 1950 c.c.; specific

gravity, 1012; total solids, 54.52 gm.; total urea, 21.45 gm.; no albumin; an occasional hyaline cast.

The case just narrated speaks for itself. Further comment appears unnecessary, and further valid deductions cannot be drawn from a single case. One fact stands forth prominently as absolutely proven and firmly established by the case, namely, that renal decapsulation can arrest the progress of uremia and of puerperal convulsions of renal origin *in the undelivered woman*. The deduction is self-evident. The production of abortion and the induction of premature labor, with all that those procedures imply for mother and child, need not henceforth be our only ultimate resources in the treatment of puerperal eclampsia.

DISCUSSION.

Dr. Henry D. Fry. I think under proper supervision and care that puerperal eclampsia ought not to occur in obstetric practice. If this case had received proper supervision it would not have reached the stage where Dr. Edebohls would have been called upon to perform renal decapsulation. It also accentuates the importance of not relying too much upon the amount of albumin, or the presence or absence of it, in threatened eclampsia. In this case, when there were decided indications of toxemia there was very little albumin, and later, after the toxemic condition became much more marked, albumin increased. If examination at that time had been made as to the amount of urea and total solids, I am sure it would have demonstrated marked insufficiency of the kidney action, and that in this case, like all such serious ones that do not yield to proper treatment, the uterus ought to be emptied and the patient prevented from going into the condition of eclampsia.

In a lying-in hospital with which I am associated eclampsia is still the principal cause of death, because we get the cases that are neglected. Over half of them—yes, three-quarters of them I might say—are of the negro population, and 50 per cent. are in labor when they are brought in, so that they have

had no preparation or supervision—no examinations of the urine made—so that eclampsia is the principal cause of death.

I am very glad to know of any remedy for these desperate cases which will offer a chance of curing them. In Dr. Edebohls' first case I do not think that the value of the operation was as well demonstrated as in the second case. In the first case the uterus was emptied very soon afterward and before there was much improvement, so that we cannot say whether the cure in that case resulted from the uterus having been emptied or from decapsulation of the kidney. These cases do improve rapidly as soon as the uterus has been emptied, but in the recent case which Dr. Edebohls has reported it shows very strongly that there may be value in the operation. In the first place, it is one of the most serious forms of eclampsia that occurs before labor, and after the operation there was decided improvement in this case in the quantity of urine passed and amount of solids. The brain symptoms cleared up, and I think it was forty-eight hours before labor set in. It showed the value of decapsulation of the kidney, and with the second case which Dr. Edebohls has reported I certainly feel enough confidence to be inclined to do renal decapsulation in these desperate cases that have failed to yield to other methods of treatment.

Dr. Hiram N. Vineberg.—I would like to ask Dr. Edebohls one or two questions. First, considering that the capsules in both cases were too large for the kidneys, and there was absolutely no pressure evidence whatever, how he would explain the improvement on that score? Second, he tells us that there was improvement in the patient's condition in spite of the fact that the kidneys did not act any more freely than they did before; that is, the amount of urine passed during the first thirty-six hours after operation was no more than it was prior to the operation, consequently the kidneys, so far as we know, did not act any better, still the patient improved. May we not account for the improvement in the patient's condition from the fact that she bled freely during the operation? Of course, improvement that occurs after delivery cannot be taken as improvement after the operation. We well know how rapid the improvement may be after delivery, and we have all seen cases in which there had been almost total suppression of urine pass several pints of limpid

urine during the first twenty-four hours following emptying of the uterus.

Dr. Edwin B. Cragin.—This is an instructive case of Dr. Edebohls', and I must confess that although I see many cases of eclampsia I do not remember to have seen any that have cleared up as markedly before delivery under any medical treatment or any procedure we have employed at the Sloane Maternity. The result in Dr. Edebohls' case speaks well for the operation.

I was going to ask him the same question Dr. Vineberg has asked, namely, whether venesection really did not have as much to do with the improvement in the case as the decapsulation of the kidney. Occasionally we see marked improvement after venesection, and that is a point to be borne in mind.

Two or three other facts have to be remembered in the treatment of eclampsia. In the first place, of the last thirteen deaths we have had at the Sloane Maternity Hospital there were five in which the lesion, as proven by autopsy, was chiefly in the liver, and although Dr. Edebohls limits his operation to cases of renal origin, it is very difficult to decide beforehand whether the lesion is chiefly in the kidney or not. In some of the remaining eight of that thirteen the liver was badly affected, perhaps with hemorrhages into the organ. When we reduce thirteen deaths by five which we know by autopsy were largely due to hemorrhages into the liver and disorganization of that organ, it leaves eight to be explained from multiple causes. Of this number I have a few notes, from the hospital records, stating the deaths as they occurred. One was from an extensive laceration of the cervix produced by accouchement forcé with profuse hemorrhage; two died from shock, one from cerebral apoplexy, and four from toxemia. It will thus be seen that we have only eight out of thirteen cases in which renal decapsulation would in any way be suitable according to the indications applied by Dr. Edebohls, and probably only in the four dying of toxemia would he consider the operation advisable. I think it is possible that in a case in which the kidney was chiefly the organ at fault it would be justifiable to try decapsulation. I do not mean to say that this was good treatment for this woman. Personally, I should say it was bad treatment for a woman as near term as she was to be subjected to the operation of decapsulation of the kidney before emptying the uterus. When the labor was easily in-

duced, as it probably would have been in Dr. Edebohls' case, personally I should bring on labor or empty the uterus by accouchement forcé, and see what the result of emptying the uterus would be.

I would like to have Dr. Edebohls take a case about six months or seven months advanced in pregnancy, with convulsions, then decapsulate the kidneys, and let us know what the results are, whether it will enable these women to go to term without any more convulsions, and without any other treatment than renal decapsulation.

The case he has put on record is remarkable. When a woman has improved as much as this one did before labor the treatment carried out certainly deserves marked and careful consideration.

Dr. Robert L. Dickinson.—I would like to ask Dr. Edebohls whether in these very difficult cases found in tenement-houses, handicapped as one would be by insufficient assistance and outfit, any lesser measure, such as free incision of the capsule longitudinally and transversely, would give relief at all commensurate with renal decapsulation?

Dr. Edward P. Davis.—Dr. Edebohls' cases are of extreme interest, but the second case is less conclusive in favor of the operation than the first, in my opinion, as so many things happened in the second case, and so many things can turn the tide of approaching eclampsia. In the first place, eclampsia being recognized as of toxemic origin has its natural history. If a patient can be tided over for a short time labor will come on, and if the uterus is emptied in a certain number of cases recovery will ensue. Those who die, die from cerebral apoplexy, toxemia, shock, and pneumonia. In this case, while some improvement ensued, still, emptying of the uretus, in my judgment, had quite as much to do with it as the operation of decapsulation of the kidney. The capsules of the kidneys were not tight. There was no glaucoma of the kidney, so to speak. In this connection I desire to call attention to a case reported from abroad, where a woman died in eclampsia, and at the autopsy double glaucoma of the kidney was found. The writer raised the question as to whether Edebohls' operation would have been suitable in that case; yet Dr. Edebohls, in his case, had both kidneys loose and no glaucomatous condition.

While I am interested in renal decapsulation, and would not

hesitate to perform it if a suitable case presents itself. I feel, as Dr. Cragin has said, that had the case reported come under my care I should not have thought of renal decapsulation. I should have treated the case by stimulating the excretory processes, and then, if necessary to induce labor, emptied the uterus. I have seen in my own experience Cesarean section followed by extraordinary improvement in the excretion of the patient, although the Cesarean section had nothing to do practically with the excretory process, yet the profound anesthetization of the eclamptic woman brought about an improvement in the excretion of urine. So many things obtain in eclampsia at times that it is questionable which brought about the improvement in Dr. Edebohls' case, venesection or decapsulation of the kidney. Cases such as Dr. Cragin has suggested would be more suitable for a fair test of this operation.

Dr. Edebohls.—Had I in my paper discussed or criticized existing methods of treatment of puerperal eclampsia a great deal of the criticism that has been brought against renal decapsulation would be justly in place. I am not discussing, however, any method of treatment at present in vogue for puerperal eclampsia. I am simply trying to add to the resources of the obstetrician in the management of puerperal eclampsia another aid in cases in which the resources at present at our command fail. We know that they do fail in many cases, because such failures are reported by all authorities, and the mortality from puerperal eclampsia varies from 10 to 25 per cent. There is room for improvement in the treatment of an affection in which such a mortality obtains.

Dr. Davis, in contradistinction to Dr. Fry, has correctly grasped the relative importance of the two cases which I have reported. The first was the more important. In that case puerperal eclampsia, which stopped two days after forced delivery, and then recurred, gave the indication for renal decapsulation. In that case, of course, we had no further chance to relieve the eclampsia or improve it by emptying the uterus, as that had already been done.

There are a great many questions in connection with the entire subject of renal decapsulation which I cannot answer at present, and which I scarcely expect to be able to answer during my lifetime.

How can we explain the immediate good effects in this case, for instance? Although no urine was secreted in the twenty-four hours following renal decapsulation, the patient's general condition during that time changed for the better to such an extent that there was no further cause for anxiety on her account. She lost much blood from the parietal vessels. Perhaps this liberal loss of blood had a great deal to do with the good effect. The explanation of the immediate good effects of renal decapsulation is at present not too clear; it is still an empirical procedure, and experimentation on animals may teach us more about it. The immediate good effects of renal decapsulation may be due in part to the massage of the kidney which necessarily accompanies the operation. Furthermore, undoubtedly the abstraction of the blood directly from the kidney which accompanies the operation has a good effect. This explanation, however, does not obtain in the case just narrated, in which not a drop of blood was lost from the kidney itself. Nor can the good effects be ascribed in this instance to the relief of renal tension. The capsule was loose and could be pinched up in large folds. In cases of chronic Bright's disease, at least in the vast majority of cases upon which I have operated, no tension of the capsule has been encountered. I have seen it in acute hemorrhagic nephritis following infection, where the kidney was immensely swollen and the capsule tightly stretched over it. We will have to await the explanation of the good effects that undoubtedly have occurred in my two cases of puerperal eclampsia until we know how to explain the good effects that follow renal decapsulation in general.

Dr. Cragin last year, when I presented my first case, told you that at the Sloane Maternity they had twenty-nine cases of puerperal eclampsia, with but one death. Those are by far the best statistics that are available, and I have not seen anything anywhere to approach them.

Dr. Cragin.—Thirteen deaths in seventy-three cases, and if I may answer Dr. Edebohls, I will say that in our service before the meeting last year we had lost nine cases out of seventy-three of puerperal eclampsia. This was last year. Out of the last seventy-three cases we have lost thirteen, instead of nine, as reported at the meeting of last year.

Dr. Edebohls (resuming). — The position taken by Dr. Cragin that the condition of the liver is the direct cause of eclampsia in very many cases is to us a new thing. Of course, we all know that in deaths from eclampsia changes in the liver are nearly always found associated with changes in the kidneys and in many other organs. That the hepatic changes are in themselves a frequent cause of puerperal eclampsia remains to be proven.

Dr. Cragin asks that the kidneys of a woman seven months pregnant and suffering with eclampsia be decapsulated, with a view to enabling her pregnancy to go to term. That is just the sort of case I have long been looking for. Unfortunately, my obstetric practice and facilities are limited. In fact, this is the only case of puerperal eclampsia I have seen since our last meeting, and I should very much like to have a woman pregnant five or six months, with puerperal eclampsia, for the purpose of decapsulating the kidneys and seeing what the result would be as regards continuance of pregnancy. I trust that one of our Fellows with large obstetric experience will soon be able to report such a case.

Dr. Dickinson asked whether renal decapsulation for puerperal eclampsia could be done in tenement-houses. The operation reported to-day was done in a tenement-house.

Dr. Davis spoke of several other things which may have had something to do with the good result in this case, mentioning among other things the anesthetic. This woman had been profoundly anesthetized two or three times prior to the operation, without any favorable influence upon her eclampsia.

PRIMARY REPAIR OF LACERATIONS OF THE CERVIX UTERI.

By Edward P. Davis, M.D.,
Philadelphia.

The necessity for immediately closing extensive lacerations of the cervix accompanied by hemorrhage, and the fact that good union followed in many of these cases, led me to investigate the immediate closure of the cervix for considerable laceration without hemorrhage.

Experience in fifty-three cases has led to the following conclusions: When the patient is not infected and when the tissues have not been subjected to sufficient violence to threaten necrosis, and laceration of the cervix one-half inch or more in extent is present, primary closure has been followed in our experience with good results. These cases usually occur in primiparæ, where resistance in the soft parts occasions sufficient delay and fatigue to require delivery by forceps. They are also seen in cases of premature labor, whether spontaneous or induced, where the cervix is not physiologically softened for perfect dilatation. They are also found in patients having spontaneous labor with very strong expulsive efforts and with large children. Naturally those cases in which the mechanism of labor is abnormal through posterior rotation of the occiput, face presentation or breech presentation, predispose to laceration of the cervix.

While primary closure of laceration of the cervix is indicated in the conditions just described, certain conditions are necessary for its successful performance. The operator must

be accustomed to operating upon the cervix. He must place his patient at the moment of delivery or afterward in a suitable position for operation, where a good light is obtained and where aseptic conditions can be maintained. He must have at his disposal the necessary facilities for asepsis, anesthesia, and the necessary assistants. Practitioners who are accustomed to deliver patients upon a low and inconvenient bed, without suitable appliances for aseptic operations, and without necessary assistants, should not undertake the primary closure of the lacerated cervix.

The technic of the operation consists in thoroughly cleansing the cervix and vagina with an antiseptic solution, and should hemorrhage from the body of the uterus be pronounced, the operator must delay until the womb contracts or must tampon the cavity of the uterus with sterile or antiseptic gauze. The lips of the cervix may be grasped at the central point by tenacula, or one strong tenaculum may grasp both lips together in the center. Loose ends of tissue should be removed by scissors, the cervix should be drawn strongly to one side by the tenacula and held by an assistant. The vaginal walls are retracted by the fingers of an assistant or by a retractor, and, beginning at the upper extremity of the laceration, stitches of chromicized catgut No. 2 are inserted, passing to the mucous membrane of the cervix, but, if possible, avoiding it. These stitches are inserted one-eighth of an inch apart and are firmly tied. They should extend to within one-eighth of an inch of the termination of the tear. The mistake should not be made of attempting to close completely the external portion of the laceration; this will heal spontaneously. The remaining laceration is closed in the same manner, and the operator may then proceed to close the anterior and posterior segments of the pelvic floor if lacerated. He may leave the uterine tampon if the condition of the uterus demands it, or it may be removed; its presence will not interfere with the healing of the laceration. After all lacerations are closed the vagina is thoroughly

cleansed with an antiseptic solution, the external parts are made antiseptic, and external dressings are applied. The after-treatment of these cases consists in careful external antisepsis. Antiseptic dressings should be constantly worn, the external parts thoroughly cleansed after the bladder and bowel are emptied. The sutures do not require removal if catgut is used, and we have seen no annoyance to the patient follow the retention of catgut for several weeks.

The number of cases under observation was 53. In these good union occurred in 45, fair union in 6, no union in 7, while infection developed in none. In 84.9 per cent. the operation was successful; in 11.3 per cent. it was moderately successful, and in 3.8 per cent. the operation failed. The percentage of infection was *nil.*

The following cases from private records may be taken as typical of those patients in whom the operation is most likely to do good: Primipara, above average age, had abdominal section for infected ovarian cyst following typhoid. During the latter weeks of pregnancy she developed acute polyhydramnios; premature rupture of the membranes with premature labor. Child small, cervix dilated slowly, exhaustion threatened while head was in the cervix. Delivered by forceps; laceration of cervix, immediate repair, complete union. Primipara, muscular, strong, highly nervous; pains lessened before rotation was complete. Patient was very sensitive to pain, tissues resisting. Delivered by forceps under ether. Unilateral laceration of cervix, central laceration of perineum extending to the bowel. Immediate closure of both; complete union. In the two cases in which failure of union occurred one was closure of the cervix following embryotomy in a patient who had remained neglected in labor for a long time.

Three objections are commonly urged against this operation: First, that in cases demanding it the tissues of the cervix are so bruised and swollen that accurate approximation is impossible and that union does not occur. To this

we reply that in cases where neglected labor has persisted so long that the tissues of the birth-canal are greatly swollen and infiltrated, immediate closure of the cervix or pelvic floor is contraindicated. In the hands of those competent to practice obstetrics, cases of labor are not allowed to come into this condition, but are terminated by timely delivery.

A second objection is found in the statement that lacerations of the cervix heal spontaneously and hence that immediate repair is unnecessary and meddlesome. In our experience small lacerations in uninfected tissue heal spontaneously. A laceration of one-half inch or more, and especially lacerations reaching nearly to the attachment of the vagina, do not close spontaneously.

A third objection is that immediate closure narrows the lumen of the os, and hence impedes the discharge of lochia. Those who make this statement confuse the immediate and secondary operations. The immediate operation leaves the cervix as large as a recently dilated cervix which has not been torn. In the secondary operation the operator reduces the lumen of the os at his pleasure.

In appropriate cases in our experience immediate closure of the cervix has given no inconvenience to the mother, and has been followed by excellent results. The operation is not advised for those who do not practice obstetrics with good surgical technic and who are not competent to operate upon the genital tract.

THE PRACTICE OF CERVIX REPAIR FIVE DAYS AFTER DELIVERY.

By R. L. Dickinson, M.D.,
New York City.

The conditions under which the cervix should be *sewed at the close of labor* are:

1. Free bleeding from an empty, firmly contracted uterus, not yielding to seizure, douches, or uterine tamponade. Here a cervical artery is spurting.

2. When the injuries are clean cuts, of known location, such as Dührrsen incisions.

3. When an immediate perineal repair is under way and any considerable cervix injury is evident.

The four conditions under which a cervix injury should be *repaired some days after labor* are:

1. Extensive injuries, such as those running out into the vagina, or into the corpus (unless they cause postpartum hemorrhage).

2. Extensive injury to the pelvic floor.

3. Exhaustion of patient.

4. Unfit surroundings, or conditions precluding careful work.

In days not long past the family obstetrician shirked search and suture of perineal tears. He has not yet faced his responsibility in the case of cervix injuries. The teacher of gynecology and obstetrics must try to impress the responsibility upon him and make clear the line between that postpartum surgery of the cervix which is unnecessary and meddlesome

and that which is essential. Toward this end the above statements are submitted.

In a previous paper ("The Best Time for Repairs of Laceration of the Cervix," *New York Medical Journal and Philadelphia Medical Journal*, March 26, 1904) I grouped the frozen sections and tabulated the measurements for the period of the lying-in fortnight. Thereby it is shown that for some three days the folded, flabby cervix squats on the pelvic floor, swollen and shapeless. A state of enormous edema, contusion, and ecchymosis is normally present. The lips measure 5 cm. (2 inches) in length, and 3 cm. (1⅛ inches) in thickness; and this great size is found notwithstanding the fact that they form part of a large circle. Abrasions and fissures give to these surfaces such a flayed and ragged appearance that sure distinction between slight and serious tears, or even between raw, untorn surface and laceration is wellnigh impossible. Repair must be partly guesswork.

If immediate repair (at the close of labor) must be done, one seizes the circle in the median line anteriorly and posteriorly with tenacula and draws the cervix downward. A finger swept about the cervix near the vaginal junction aids sight in finding the deeper injuries that run nearly to the vagina.

One of the double tenacula is then shifted so that both lower corners of the tear are hooked in one grasp, whereby the sides of the injury fall together and are drawn downward and across and into view, and readily sutured, each stitch swinging across in a single bite. Operating at this time, one is handicapped by the blood flow; by the distortion spoken of above; by the inability to anesthetize, because the consequent relaxation of the uterus will bring about blood loss, and by the absence of adequate assistance and a rested back.

In the small class of cases where the fifth-day operation is desirable—and let me emphasize the smallness of the class—the conditions for repair are ideal. Swelling has measur-

ably subsided. The parts are recognizable in contour and consistence. Ether can be given. Bleeding is slight. The surfaces are still raw and ready to unite. The parts may be fully exposed. The tissues are still soft. On a table, in a good light, one can do careful and unhurried work.

As one draws toward the tenth day a gauze sponge will no longer suffice to reproduce raw surfaces; the curet must clean off granulations. After this time one may as well postpone repair until the end of lactation. Then, however, and for all the later years, the original injury may again be a matter of conjecture. Eversion, erosion, and contraction of scar tissue, chronic inflammation or cysts may produce changes that render exact coaptation not certain. Our successes in late repair are, of course, remarkably constant, but an occasional defective and asymmetric restoration shows that this time is not ideal.

It is understood that most injuries to the cervix take care of themselves. Very few cause bleeding at the close of labor sufficient to call for immediate suture. Most hurts will be discovered months or years later in the office of the gynecologist. Therefore few will fall in the division which I may label, for convenience, the fifth-day repairs.

These will be mostly injuries found after severe labors. They are usually conjoined with considerable injuries to the pelvic floor, and one finds them in doing a deferred operation on the pelvic floor. Eventually the number of fifth-day repairs will increase, because the cervix will be examined for injury more systematically at the close of labor and some days after, and because repair of considerable injuries to the pelvic floor will be more commonly deferred until several days after labor. That is, we shall have more gynecology in our obstetrics, and less hurried work on major injuries.

LACERATION OF THE CERVIX UTERI.

By J. M. Baldy, M.D.,
Philadelphia.

As in most good things which have been proposed in this world the disciples of Emmet have "Outheroded Herod" in the matter of his operation for repair of laceration of the cervix uteri, which may be accepted as a matter of course; but what is really surprising in the matter is that they have continued so long in their extreme beliefs and the propagation thereof. In a long experience with and observation of these lesions, the original views expressed by Emmet (who feared and protested against extreme views as likely to react against an extremely useful procedure) seem more and more to have been warranted. In his very earliest remarks on the subject he says: "Yet the fear is not an idle one that the operation, which will accomplish more than can be gained by any other means when employed within its proper range, may fall into disfavor through abuse of its practice. The operation has been done too often when no necessity for doing it has existed. . . . The simple existence of a fissure in the cervix does not justify an operation for its closure." Even such an experienced pioneer as Goodell came to the realization that he had so abused the operation and with his usual candor admitted the fact and sounded a warning against it.

Time has modified even some of Emmet's early views in this matter, and, according to Pryor, "the cicatricial plug, which at one time was even thought to cause optic neuralgia

as well as other reflexes, has disappeared in the light of more precise pathology." No one can examine a series of sections of the tissue removed from the angles of these tears under the microscope without soon becoming convinced of the truth of this observation. The vaginal mucous membrane covering it is in all respects similar to the healthy vaginal mucous membrane covering the cervix which blends with a mucous membrane in most respects similar to that lining the cervical canal, with little or no difference in the transitional stages. The arrangement of the underlying connective and muscular tissues differs little from the normal, and then only in the excess of connective tissue, and the point which strikes one most is the fact that this small excess above the normal of connective tissue is no more noticeable in the tissues taken from the angles than it is in the tissue of every part of the cervix obtained by amputation of that organ.

The significance is clear; the connective tissue overdevelopment is not due to the granulation tissue of the healing angles, as was enunciated by Emmet, but to the inflammatory deposits which have invaded the whole cervix through its torn and infected surfaces. As a matter of clinical fact, let the cervix uteri be torn as deeply as you chose, if you preserve the parts from infection, the greater part of the tear will heal spontaneously and the balance of it will remain perfectly healthy, as much so as did the lobe of the ear which had been torn through by the weight and drag of our great-grandmother's ear-rings; the lips will remain uninfiltrated, of normal size and thickness, with no eversions and no erosion of the lining mucous membrane. In such a case there will be no untoward symptoms and no bad effects whatever.

And herein lies the hint as to the proper treatment of the acute cases. There is a tendency among obstetricians to repair these lacerations primarily. The objections to such practice are manifold, and I admit a prejudice against it. The

objections are, enormously swollen lips and difficulty in a proper adjustment of the surfaces. Moreover, the subsequent shrinkage of the tissue under the sutures is of such an extent as to be uncontrollable both for purposes of apposition and for the prevention of the invasion of infection between the lacerated surfaces. The puncture points of the needle bleed about as freely as do the torn surfaces, in fact, oftentimes more so. When shrinkage has taken place to a certain extent infection may be readily let in, but it proportionately becomes impossible to cleanse the wounds. The effect of an operation on the morale of the patient at such a trying period is by no means the least of the objections. In general, it were far better even in an infected patient to trust to the efforts of a clean nurse with a cleansing douche than to those of a dirty or an indifferent surgeon, after whose work the efforts of any amount of clean nurses would not avail. Whatever may be ideal surgery under the exigencies of actual practice, the treatment for recent lacerations of the cervix remains, and I believe will remain, rigid local cleanliness, excepting where there be a sufficient hemorrhage to demand a ligature. Where non-infection can be assured and where the torn lips are not unnecessarily disturbed by the careless use of the nozzle of a syringe spontaneous healing of these lacerations may be expected to a greater or less degree, and what tear remains when nature is through with her work will be of a healthy character, will give no future trouble, and will need no surgical interference.

To obtain such results is, of course, utopian, and not to be expected. All degrees and conditions of lacerated cervices exist and will continue to exist. Fissures continue as deep as was the original laceration; lips are infiltrated, and do not involute, and in consequence become everted both by their thickness and the tendency to contraction of the new tissue (formed from the inflammatory deposits). The infection of the lacerated surfaces not only brings this about, but produces also an erosion of the mucous surfaces, which erosion

is subsequently kept up and even exaggerated by the discharges from the infected lining membrane of the uterus itself—a discharge which is continually pouring down through the cervical canal and accumulates in the cul-de-sac of the vagina to constantly bathe the already irritated, eroded, and everted lips. The constant rubbing of the cervical membranes against the vagina, the traumatism of coition, etc., as put down in most books have little or nothing to do with either the production or the continuation of these erosions. Stop the acrid discharges from the uterus, keep the eroded surfaces free from their own discharges, and they will soon disappear.

The symptoms of chronic lacerations of the cervix uteri are essentially local in their production, and remain local in their manifestations. I have no sympathy with the views which attribute reflex symptoms to these lesions. There is a leucorrheal discharge which comes purely from the eroded mucous membrane of the cervix and the infected mucous membrane of the fundus. There is a weight and bearing down in the pelvis which is due to the size and inflammation of the cervix itself; this is not infrequently added to by a displaced fundus, an endometritis, prolapsed ovaries, an inflammation of the ligaments radiating backward from the cervix, or by a general sagging downward of the uterus, with relaxation of its supports. When these complications occur and the patient has been a long sufferer it is easy to understand how she may become neurotic and suffer from all the ills of chronic neurasthenia. But in uncomplicated cases, where there simply exists a laceration of the cervix uteri with everted and eroded lips, producing a constant leucorrhea and a feeling of weight and uneasiness in the pelvis and about the rectum these so-called reflex symptoms do not exist. I do not deny that many a woman with a lacerated cervix has "chronic nerves" with all that implies: headaches, tired feelings, backaches, leg aches, indigestion, sleeplessness, inability to walk, and the whole interminable

list. What I deny is the relation of cause and effect. In the first place, there is no "cicatricial plug" or "scar tissue" in the angles, and if there were, where else in the body does scar tissue produce such effects? In this connection it is worth while to note that the cervix is particularly free from nerve filaments, more so than most any part of the body—how can you have reflexes without nerves?

Irregular menstruation only occurs when the endometrium is involved, which in the surgical cases it must be admitted usually obtains. Pelvic pain as pain does not occur. There is a sense of soreness such as would accompany an erosion in any part of the body, especially when disturbed, but, although pain is mentioned as an accompanying symptom of this condition by such a recent writer as Penrose, and attributed to pelvic lymphangitis and lymphadenitis, we look in vain with the microscope for any signs of lymphangitis in the tissue removed or any cause in it which would produce sufficient irritation to induce such a condition in the pelvis. The whole truth is that the innumerable symptoms attributed to laceration of the cervix are in great part far-fetched, and in most cases caused by complicating conditions.

I see no reason to depart from the opinion long ago expressed by Emmet, that the majority of lacerations of the cervix heal spontaneously, that large numbers remain as secondary conditions which need no subsequent surgical interference, that the conditions which indicate the necessity of surgical repair are the existence of infiltration sufficient to induce eversion of the lips and consequent erosion of the mucous membrane lining the inner surfaces of the lips. And it is further true that in the vast majority of such cases there is an accompanying infection of the endometrium which needs the use of the curet.

There is one belief prevalent which would warrant, nay, demands, a repair of every lacerated cervix, the belief that lacerations of the cervix produce carcinoma. In this belief I take no part, and no one has to my knowledge as yet pro-

duced a single scientific fact which will uphold such a theory. The proofs are purely clinical, but such as they are they in no way appeal to my sense of reason. The one and only proof offered us is that cancer of the cervix occurs for the most part in women who have lacerations of the cervix. This may be accepted as true, but not nearly to the extent it was some years ago. What gynecologist has not in recent years observed cancer of the cervix in a nullipara, in a number of instances of both married and unmarried women? In this connection it must be borne in mind that cancer is largely a disease of middle life, at least of an age at which the vast majority of women are no longer nullipara and have had lacerations of the cervix uteri to a greater or less extent; and that as age advances the lacerations become more frequent and cancer more prevalent. In other words, the two conditions are prevalent at the same period of life. Is it, then, strange that they should be so frequently associated? Would it not be short of marvellous if a developing cancer should miss a lacerated cervix? Is it the rule for cancer to develop at the seat of a traumatism in any other part of the body? Is it proven that traumatisms elsewhere have anything whatever to do with cancer? At none of the common seats of the disease in the intestines or any of the internal organs is this true, nor in the breast, nor in the fundus of the uterus. Why, then, in the cervix only? It will be said the traumatism is not the cause, not the scar tissue, but the chronic irritation. Chronic irritation in other parts of the body causes inflammation not cancer. In some few instances it is thought chronic irritation does so, but where it is supposed to produce cancer once it produces inflammation a hundred times. At any rate, where there is no eversion and no erosion there is no irritation in laceration of the cervix, so what of the cancers which develop in such cases? In vain I have looked with the aid of the microscope for any physical changes in the tissue of a lacerated cervix which would indicate any such probability. The

conditions are normal in every respect. The mucous membrane is practically normal, as are its glands; even where cancer has developed there is nothing abnormal about the contiguous tissues. The old theory of the plug in the angle being the source of the irritation is exploded, because there is no such plug and because the vast majority of cases of cancer begin to develop at the tip and spread into the angles instead of the reverse, as was formerly believed. As far as we know it may begin at the tip at that exact point which was the original part of the cervical canal. In this case if chronic irritation is the cause, why should we not have it more frequently in nulliparæ? Surely there are plenty of nulliparous women with specific and infective irritating discharges from the uterus, with eversion of the os, especially old maids. It is asked why we have the cervix uteri as a favorite point of development of cancer? I may ask, Why the breast and other parts of the body? No one claims these causes for the breast and for the different parts of the colon, for instance. We simply do not know; but because of this it is no proof that these theories are correct.

To me the proposition is an unproved theory in which I do not believe, and according to which I do not practice. In twenty years' work I have not seen a single case of cancer develop in a laceration of the cervix which I have refused to repair, and from what I have had to say of these lacerations you may imagine the number have not been few.

DISCUSSION OF THE SYMPOSIUM ON RECENT INJURIES TO THE GENITAL CANAL.

Dr. Henry T. Byford.—About twelve years ago I was asked to deliver an address before the Kalamazoo Academy of Medicine, and I felt safe there in introducing any radical views which I might have. I read a paper advocating the "Immediate

Repair of Lacerations of the Cervix," and have had numerous opportunities to do the operations.

With regard to these frozen sections, while they are valuable for certain purposes, I do not think they show the proper relations of the uterus and fundus in life. When we introduce the finger we can feel the location of the laceration. Dr. John Bartlett, of Chicago, suggested the introduction of the index finger within the cervix with the third finger of the same hand in the fornix against the outer wall of the cervix. By carrying these two fingers around the cervical rim, one finger against the inner wall and the other against the outer wall, one can readily recognize the defects caused by the lacerations. If we pull down the end of the cervix with a tenaculum we straighten out the folds and bring the lacerations where they can be seen and repaired. I do not see any good reason for leaving the laceration for five days. When the cervical tissues are not bruised too much, it is good surgery to close a laceration as soon as possible. I have found hardened catgut efficient.

I would like to ask Dr. Webster if in these frozen sections the relation of the parts are not altered from those which existed during life, because of postmortem relaxation, and if the transverse folding is not due to the fact that the uterus settles down upon the posterior vaginal wall?

Dr. Lapthorn Smith.—I think we should, on the one hand, do all in our power possible to prevent lacerations of the cervix, and, on the other hand, repair them as quickly as possible when they occur. I think the difficulty mentioned, that the general practitioner is not prepared to repair these lacerations immediately, does not hold good, because most practitioners know when a laceration is going to be produced. These lacerations do not occur, as a rule, by themselves. The man who tries to drag the fetal head through the cervical canal before the os is dilated knows that he is going to do damage. If he interferes twelve hours too soon he is going to have a laceration of the cervix, and he should make preparations for it, and either have a gynecologist on hand to repair the damage for him or do it himself at the time. It is better to do this than wait twenty-four hours after the confinement before doing it. This Society can teach anything and it should teach the one hundred thousand doctors on this continent that they should prevent

these lacerations by giving the woman time; but when they do occur, to repair them promptly.

Dr. Baldy in his paper referred to eversion of the lips, saying that the laceration was a small affair and did not cause much suffering. Emmet's name will be remembered long after ours are forgotten, just for having taught us the immense importance of lacerations; and most of us know that many of these women live miserable lives because the lacerations of their cervices have not been repaired. The mere fact that the parts are exposed to constant friction which, being covered with cylindric epithelium, were not meant to be exposed to friction at all, is sufficient reason for repairing a lacerated cervix.

Dr. Edwin B. Cragin.—No one appreciates the responsibility of teaching more than myself. I must confess that I am afraid to teach students, men who are not thoroughly trained, that every laceration of the cervix should be repaired. I feel this way: that where there is a severe laceration extending up into the vaginal fornices, so that there is marked hemorrhage from it, it should be repaired; also in the conditions outlined by Dr. Dickinson for immediate repair—that is, where there is marked hemorrhage, where there are clean-cut incisions in the cervix, and where you have the patient under the influence of an anesthetic and are repairing the perineum, and have the cervix plainly in view and find it extensively lacerated. In these conditions I believe immediate repair is the proper thing to do, but to teach students that they should repair every cervix that is torn would, in my judgment, be bad practice, and more lives would be lost in the puerperium than are now lost, on account of the fact that they would in all probability sew the cervix too tightly, drainage would be thereby insufficient, and a great many of the women would die from infection.

In regard to making these repairs at five days, I must say that I cannot bring myself to see the matter in that light, or to think that is the proper thing to do. While under these conditions we may not increase the danger of infection in so doing, I would rather wait until the puerperium was passed, until the lochia had ceased, until we had a good chance to see how much nature had done, and then with good light and competent assistants, repair what is needed to be repaired.

In regard to Dr. Baldy's remarks, I must confess that if we

watch the beginning of an epithelioma of the lip, or the beginning of a cancer in any part that is exposed to friction, even taking such a thing as chimney-sweeper's cancer, it seems that multiplication of the epithelial cells is more likely to occur where there is friction of the part that is involved. In my experience it has seemed that epithelioma of the cervix followed more closely on a laceration with everted mucous membrane than on anything else. We have to admit that a laceration of the cervix does harm from the fact that it prevents involution of the uterus; that it increases the weight of the uterus, and from the eversion of the mucous membrane, congestion of the cervix, and the changes in the glands cause a leucorrhea. I do think, however, that repair has been done in cases not requiring it; but this should not prevent us from operating on cases which really need it.

Dr. A. Palmer Dudley.—In the five minutes allotted to me, I will speak of the technic of immediate repair; but previous to doing that I want to say that this is an old subject. These points have been hashed and rehashed, and we should give credit to the dead for this. It is a well-known fact to the older members of this Society that Dr. Ambrose Pallen was the first man to write upon this subject, over twenty-five years ago, and if any of the members will take the trouble to look up his writings on this subject they will find there is not much, if any, improvement to-day on the methods advised at that time. Furthermore, if you will look up the *Transactions* of the Blue Book, you will find that more than twelve years ago I reported twenty-one cases of immediate repair without the slightest evidence of sepsis following in any of them. I agree with the speakers that it is unwise to advise undergraduates to do the immediate operation, unless their teacher at the same time shows them how to do the work, and I am well aware that I am speaking in the presence of trained obstetricians and gynecologists who are going out to teach. I am not speaking to the general practitioner, and I want to say it is one of the easiest things in the whole field of gynecology to sew up a lacerated cervix immediately, and it is one of the safest things to do. The object in doing it is to simply adjust the torn lips, and nature will do the rest. I doubt the wisdom of putting a patient under an anesthetic five days after a hard delivery and subjecting her

to a second surgical operation, when in five minutes' time it could have been done in safety if a man is clean. He should operate with gloves on always.

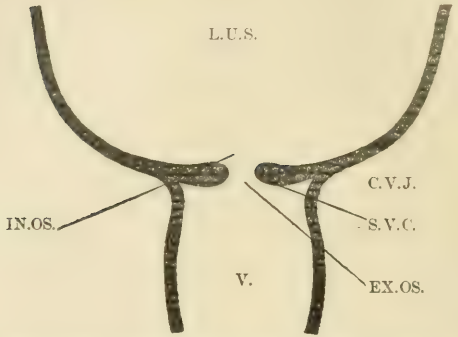
Speaking of the manner in which this work has been done, and I wish to confine myself to the technic, if a man can sight a straight line he can take the meatus of the urethra as his guide, and with a pair of forceps measure along the anterior median line of the vagina and catch the median line of the cervix; in the same way if he will sight from the centre of the anus, along the posterior vaginal wall, he may catch the posterior lip of the cervix, and bring it down with one hand, and all he needs to do is to put in a little whip-stitch of catgut on each side of the forceps which holds the torn lips together. If this can be done in five minutes, and it can, why should we subject a woman to another operation later. It is simply an operation to appose the lips. That is all. According to my way of thinking, it is pernicious teaching to advocate repair of these lacerations five days after their occurrence. I believe they should be repaired immediately.

Dr. J. Clifton Edgar.—In regard to the anatomical conditions in these cases, we have two distinct classes of cases before us this morning. On the one hand there is a class of cases which I recognize clinically and anatomically, in which there is such a condition as in Fig. 1, where the internal os is drawn up and has disappeared in the region known as the lower uterine segment, between the external os and contraction ring, and such a condition as this corresponds with that of the five minutes' after-labor frozen sections observed in the diagrams on the opposite side of the room. This class of cases is most frequently observed.

Another class of cases entirely different from Fig. 1, I have depicted in this rather rough diagram (Fig. 2). I have specimens from patients who have died from eclampsia in the Bellevue Hospital service which represent both these two conditions. The anatomic conditions in Fig. 2 are entirely different from those in Fig. 1. It is not a difficult matter to insert sutures in such a condition as is represented in Fig. 2.

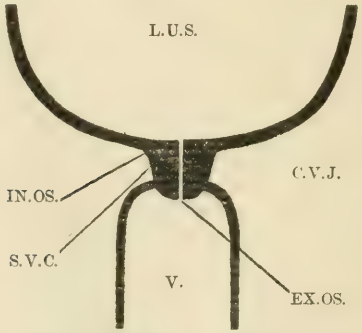
I would be very loath to teach undergraduate students immediate repair of cervical lacerations. This question was agitated in New York in 1894, 1895, and 1896. The pendulum swung

Fig. 1.



Lower uterine segment during labor. V., cuff of vagina. EX.OS., external os, infravaginal portion of cervix has disappeared. C.V.J., cervicovaginal junction. S.V.C., supravaginal cervix, small portion only remaining. IN.OS., internal os. L.U.S., lower uterine segment.

Fig. 2.



Cervix in latter part of gestation or at beginning of labor; vaginal and supravaginal portions of cervix unchanged. V., cuff of vagina. EX.OS., external os and infravaginal portion of the cervix. C.V.J., cervicovaginal junction. S.V.C., supravaginal portion of cervix. IN.OS., internal os. L.U.S., lower uterine segment.

one way and then the other, and at one time we were sewing up all lacerated cervices. At the Bellevue Hospital Maternity Service, the internes at one time sewed up every lacerated cervix, whether severe or not. The results were not favorable. The morbidity in the New York Maternity Hospital was not as it should have been, and I attributed that increase in morbidity to this interference. The immediate repair of lacerated cervices was, therefore, discontinued, and the results were better.

With regard to sewing up a lacerated cervix in the presence of hemorrhage, I do not think a laceration of the pelvic floor can be compared with one of the cervix as far as subsequent trouble and inconvenience to the patient are concerned. Veterinary surgeons see many cases of laceration of the cervix in lower animals. They look upon it as a natural occurrence. They certainly do not regard it as a pathologic condition.

Dr. Henry C. Coe.—I think that Dr. Davis struck the keynote when he stated that the immediate repair of a lacerated cervix should be done only under proper conditions, by a skilled operator, with the patient on a table, and with a good light.

In most of my cases I have performed immediate operation only after a severe instrumental delivery, or where arterial hemorrhage had to be controlled. The fact that these operations on lacerated cervices have been followed by such good results has led me to think that the immediate operation can be properly performed as well as one subsequently. But we must not forget its limitations.

I take issue with Dr. Baldy in regard to carcinoma following laceration of the cervix, while, on the other hand, I agree with his criticisms as to the frequency of so-called "reflex neuroses" and chronic metritis. Personally, I long since rejected the term "chronic inflammation" of the uterus, as I simply regard it as a hyperplasia of connective tissue. I accept Dr. Baldy's challenge to prove that epithelioma can develop from erosion and glandular hyperplasia incident to a lacerated cervix, as I have microscopic slides that prove such a sequence. In such cases I should either let the cervix alone or amputate it. I believe that amputation is often a prophylactic against carcinoma. The best legacy that Emmet has left to us was to demonstrate the fact that lacerated and eroded cervices may

become the seat of epithelioma. I have on several occasions amputated such cervices and have demonstrated commencing epithelioma. It seems needless to discuss anew the subject of the development of carcinoma at a point of irritation, because the more we study carcinoma the less we seem to know about it; but certainly all the evidence appears to point to the fact that the mucocutaneous margins are the favorite sites of epithelioma, as they are favorite points of irritation, as the anus, mouth, cervix uteri, etc.

Dr. J. Whitridge Williams.—I hope the American Gynecological Society will not go on record as advocating the immediate repair of all cervical tears immediately after labor. For my part, I consider that the only indication for immediately repairing a freshly lacerated cervix is severe hemorrhage. I oppose the immediate repair in all other cases for the reason that the necessary manipulations undoubtedly markedly increased the danger of infection, and our ideal should be to handle the freshly delivered woman as little as possible; and I am sure that were such a practice as advocated here to-day to become general, even in the hands of experts, puerperal infection would be more frequent than at present.

In regard to postponing operation for six days, I would say that if the tear does not give rise to hemorrhage immediately after labor the intermediate operation is unnecessary, and I think we can obtain much better results by deferring the operation until later. I consider that it is the duty of the practitioner to make a thorough pelvic examination of every woman he delivers before dismissing her from his care, and if any condition be found which demands operation, it should then be attended to by him or some other competent person; as I feel that by pursuing such a course the patient will not only be in better health ultimately, but that the conditions will be repaired much more satisfactorily than at immediate operation.

In my hands immediate operations, not only upon cervical but upon perineal tears as well, occasionally give unsatisfactory results, even though the healing be by first intention, as it is sometimes impossible immediately after labor to bring the loose and flabby parts into the desired apposition.

Likewise, from my own experience, I know that the results following secondary operations ten days or two weeks after labor

are not nearly so satisfactory as when the operation is performed at the end of the puerperal period.

Dr. Hermann J. Boldt.—The question of immediate repair of lacerated cervices is largely a matter of personal opinion. Dr. Cragin struck the keynote in his discussion of this subject, and it is unnecessary for me to reiterate what he has said. The very interesting paper of Dr. Davis gave us excellent reasons why a lacerated cervix should not be repaired immediately after labor, and he mentioned a number of instances in which he had complete failures, and some in which there was infection subsequent to the operation.

Dr. Davis.—There was no case of infection reported in my paper.

Dr. Boldt.—I misunderstood you. Dr. Dickinson mentioned a certain period for the repair of these lacerations subsequent to the accouchement—five days after delivery. If permitted, I will mention a paper which I read before this Society on the repair of lacerated cervices after confinement, sixteen years ago, which covered practically the same ground referred to by Dr. Cragin. In that paper I stated that we should wait until the puerperal period has passed, then examine the woman, and if it were necessary to do any work on the lacerated cervix that was the proper time to do it. It could be done without any cutting, denuding the surface with a sharp scalpel, and introducing catgut sutures. I do not remember a single instance during a period of eighteen years in which I have seen a failure, and the results have been invariably good. My views since that time have been more or less modified. To repeat: wait until the puerperal period has passed, say two or three weeks, then an operation may be done, and catgut can be used, and we will have practically a perfect condition of the parts subsequent to operation.

Dr. Seth C. Gordon.—I wish to say a few words in regard to Dr. Baldy's paper. I agree with him that there is no necessity for so many operations on lacerated cervices simply because they are lacerated, and I see no reason, independent of symptoms which may develop, for repairing so many of them as has been done in the past. I have expressed this view before this Society several times before.

I do not agree with Dr. Baldy, however, that these lacera-

tions are not foci of cancer. I believe the clinical history of cancer will scarcely bear him out in the statements he has made. In my whole experience I have never seen a case of cancer of the cervix uteri in a nulliparous woman. Others may have seen it, but I never have, and, therefore, I believe that it is undoubtedly a source of malignant disease if the laceration is left unrepaired. In those cases where there is eversion of the mucous membrane, hyperplasia of the uterus left from a lack of involution of the organ, I believe the laceration should be repaired, but not immediately. I do not believe in immediate repair of the lacerated cervix as a rule. After three or four weeks or two months these women should be carefully examined, and, if we find an extensive laceration or eversion of the mucous membrane, I believe a thorough trachelorrhaphy should be done, and we should close in the mucous membrane, which is subject to constant irritation. I do not believe we can repair these cases too early after the puerperium is passed.

That every laceration, however small, should be repaired is altogether wrong. Altogether too much of this work has been done, and when the cervical canal has been closed drainage has failed to take place, followed by infection of the uterus, which oftentimes has extended up the Fallopian tubes in consequence of drainage having been interfered with. Such cases had better be left entirely alone or the cervical canal even dilated than subjected to treatment by denuding the edges of the tissues and bringing them together, thus narrowing the drainage canal. I believe in free drainage in all of these cases, and that dilatation and curetting will oftentimes do more for them than attempts to repair slight cervical lacerations.

Dr. Andrew F. Currier.—Most of the speakers who have participated in this discussion have admitted the necessity of immediate repair of the lacerated cervix in case of hemorrhage, but have failed to emphasize the fact that in most of those in which hemorrhage occurs the most extensive lacerations of the cervix occur, and I think it is well to bear in mind those coincident facts, because with very many of the general practitioners the fact that hemorrhage takes place is looked upon as being the result of hemorrhage from the interior of the uterus. The cervix is not examined, and evil results follow any tear which may be present. This may be obviated by an examination in

any case in which hemorrhage is present, and a determination made as to whether the hemorrhage comes from the torn cervix and accompanying rupture of the artery in the cervix, or whether it comes from the interior of the uterus. This important point thus far has not been touched on.

Of course, the matter of immediate repair of the tissues of the pelvic floor is one upon which there will be little disagreement, and it seems to me that any obstetrician is lacking in the performance of his duty if these lacerations are neglected, and I do not see what objection can be raised to pursuing this course.

As to the effect of lacerations of the cervix following labor, there must be differences of opinion. The fact that trachelorrhaphy has been frequently done is no argument against its performance when extensive lesions exist. Even though the whole question of reflex symptoms be left out, even though the remote conditions dependent upon these may be left out of consideration, if we have an everted cervix, with extensive discharge and with manifest lesion, the indication for the gynecologist is to repair the condition. As to the reflex symptoms arising from this condition, too much stress has been laid upon them, and I think the teaching which has gone out from gynecologists that they are to be expected in the great majority of cases should be modified.

Dr. Willis E. Ford.—The question of immediate repair of a lacerated cervix should be left to the individual judgment of such men as are here. On the other hand, immediate repair in the average general practitioner's hands is likely to be attended with disastrous results.

I wish to say a few words with regard to the subject of cancer, inasmuch as it has been brought up. In the State of New York we have had for several years a cancer laboratory which is supported by State funds. It is for the purpose of making collective investigations regarding cancer. It is maintained by a great many practitioners that cancer is more likely to occur from lacerations of the cervix than from infection. There are certain localities where cancer is very prevalent, and other localities in which it is not. I live in Central New York. In the locality south of me, in one township, one-eighth of the deaths that occurred in thirteen years was due to cancer. You cannot

say that it is well established that irritation from laceration of the cervix has produced cancer, although it is said cancer develops in the cervix in women in one-fourth of the cases.

As regards reflex symptoms, that term has been used by men who do not know much about the terminology of the neurologist. The term reflex symptoms has been used instead of transference of symptoms. There is no such thing as a continuous reflex sensation; but a transference of symptoms from one part of the body to another by a cicatricial plug in the cervix is absurd, and I indorse what Dr. Baldy has said on that phase of the subject.

Dr. Daniel H. Craig. I am glad to have the privilege of saying a few words in connection with this symposium. Last year I presented a paper before the American Medical Association upon this subject, and the result of my studies as to the immediate repair of the cervix was a firm conviction of its lack of utility. There is no doubt but that the members of the American Gynecological Society can get a large percentage of primary unions without repair; that they can get practically eighty-seven per cent. of primary unions after primary surgical repair, because they do clean obstetrics and clean surgery. It seems to me the pivotal point regarding the non-healing of a laceration of the cervix is as to whether or not it is clean. If it is clean it is rather superfluous surgery to subject a woman to an operation for sewing it up when it will heal itself, and the chances are it will heal if clean. On the other hand, if it is not clean, sutures will not force the tear to unite, and it would be rather unsafe surgery for an unclean man, in a technical sense, to undertake the immediate repair of lacerated cervix, and moreover it would be useless surgery; at the same time it is equally useless, when a woman has a clean cervix, for the practitioner to sew it up, because it will be fully as liable to unite without operation. The cases which I cited last year seemed to be very instructive examples of that point. I found three cases in which there had been violent, quick, rapid labors, resulting in extreme lacerations of the cervix, as testified by the scars, away up into the vaginal vault. The cervices were voluntarily restored in all three of these cases without suture simply because they were clean, no vaginal examination having been made.

Regarding the question of carcinoma in my work of last year,

I was unable to find one unmistakable instance of this disease developing at the site of a properly repaired cervical laceration. Since then, however, I have had letters from one or two men in which they speak of the occurrence of carcinoma in a cervix that has been properly repaired. In all of my personal work, however, I have been unable to find any such authenticated cases in which carcinoma had occurred in a properly repaired cervix. The starting point of carcinoma is dependent upon the question of cellular irritation.

Dr. W. Francis B. Wakefield.—If we look upon the subject of primary repair of cervical lacerations from the standpoint of the teacher, I fully agree with what has been said, that it is dangerous practice for the average practitioner to repair all lacerated cervices immediately after the labors that occur in his practice. But if we regard the subject from the standpoint of the practice of the members of this Society or similar organizations, I am thoroughly in accord with all that Dr. Davis has said, and I make it a practice to repair the cervix immediately after labor, and my results have been practically the same as those of Dr. Davis. I do not see any reason why we should let a woman wait for four or five days, then undertake the repair of her cervix. I would either repair it immediately or leave it until the puerperal period is over, and then repair it. But I am a strong advocate of immediate repair of lacerated cervices. I agree with Dr. Baldy that there are many lacerated cervices repaired that do not require it. I cannot agree with him, however, in regard to what he said about repair of old bilateral laceration of the cervix, with eroded surfaces, everted lips, and a general hyperplastic condition. When the cervix is in such a condition, I agree with Dr. Coe that the proper treatment is amputation of the cervix.

Dr. Bache McE. Emmet.—In regard to the immediate or remote operation for repair of the lacerated cervix, I wish to confine what little I have to say very largely to my experience in gynecologic work, and to what little obstetric work I have done and observed. From my own observations, and from what I have known of this subject in early times, I should say it is right to repair a lacerated cervix that is attended with hemorrhage. Most of the ordinary cases of laceration of the cervix, however, when clean, if the uterus contracts properly, will take care of

themselves. We find evidences of cicatrices in those cases in which there has been quite extensive laceration, and yet no trouble had followed. There are many cases of laceration of the cervix in which no harm has resulted from non-operative interference. The cases I have seen in which operation has been called for have been those in which there has been a lack of repair and a condition of great subinvolution remaining. The cases in which the greatest good can be effected by operation ultimately are those in which no laceration is apparent. I take it, in those cases in which the lacerations have been extensive, extending up toward the internal os and vaginal attachment, in which there has been some cicatrization and granulation, there has been great harm. I find the presence of granulation tissue in the form of a plug, as renounced by Dr. Baldy, and it is constantly the ever-present result of a cicatrix. I believe so firmly in the pernicious effect of it that I do not hesitate to open the cervix and cut a V-shaped piece away up to the internal os and up through the substance of the uterine tissue at this point and remove it. When I see evidence of marked relief to the patient within twenty-four hours, without any suggestiveness on my part, and she says: "Doctor, my head is clear. I feel my stomach is now enabled to take food that I have not been able to take for years," I know I have done the right thing.

Dr. J. Clarence Webster.—In regard to the anatomic conditions and with reference to what was said regarding the frozen sections, I would say that Dr. Dickinson has quite correctly stated that the cervix has the irregular shape he referred to in a considerable proportion of cases; and Dr. Edgar has also pointed out clearly that there are variations immediately postpartum.

With reference to Dr. Byford's statement, it may be said that the condition in such frozen sections is as near the condition in the living patient as can be obtained. In my case death occurred about 10 o'clock in the evening, and the specimen was in the ice-box the next morning. The physical conditions of the pelvis are such as to make it impossible for the uterus to sink down. That indefinite statement, postpartum relaxation, is overdone, and it must not be considered in connection with such specimens as these. In vertical mesial, transverse, or oblique sections of the puerperal pelvis it is seen that the uterus occu-

pies a great portion of the upper part of the pelvis, and that the broad ligaments are so disposed as to make it impossible for the uterus to sink down any appreciable distance. The crumpled cervix is folded as represented. One notices the nearness of the uterus and cervix to the sacrum; the empty rectum is packed between the sacrum and vagina and uterus. The uterus may be elevated by a distended bladder, but it is really more firmly fixed in the pelvis than is the normal non-pregnant uterus.

Dr. T. J. Watkins.—I would like to emphasize the very close relation between endometritis and pathologic laceration of the cervix. We seldom, if ever, encounter a pathologic tear of the cervix in the absence of an endometritis. What we formerly believed relative to eversion of the lips of the cervix and erosion is not correct. We very frequently get extensive eversion of the lips of the cervix without any erosion. Those are the cases that are unattended by endometritis. In cases of endometritis with laceration of the cervix there is nearly always erosion, and the amount of erosion is not necessarily proportionate to the amount of eversion. I consequently believe in these cases that the treatment of the endometritis is quite as important as that of the laceration of the cervix. One can state positively, I think, that there are only two indications for remote operations on the cervix: (1) erosion and (2) marked cystic degeneration.

Dr. Davis.—Lack of time forbade the mention of the bibliography of this subject. My paper was a narration of my experience only. Before we closed lacerations to a considerable extent the patients lived with their cervices in a fair condition, but since we have closed such lacerations as have been described they live in a better condition. My paper was largely limited to the closure of these lacerations by skilled operators, possessing the requisite appliances for an aseptic operation. I believe that none but such men should attend cases of confinement complicated by laceration, malpresentation, or any other abnormality, and the sooner obstetrics is placed upon the same plane as skilled surgery the better for women, the better for the medical profession of this and other countries, and it is with these limitations that I have narrated my experience.

Dr. Edgar has described the anatomy of the cases in which

immediate operation is indicated and most successful. The five-or-six-day closure does not appeal to me as rational, although I may be mistaken, and I am quite open to conviction; but I do believe a skilled operator will, by delivering women promptly and closing any lacerations of the cervix which may exist aseptically and skilfully, put them in a condition where perfect convalescence will ensue in the vast majority of cases.

As regards the general practitioner, while I have respect for him, I am not inclined to legislate in matters of science in this Society with reference to him, nor what he does, as I do not believe he is the proper attendant for a case of obstetrics complicated by a laceration of the cervix, hemorrhage, or other condition demanding instrumental interference.

The obstetric teachers here present hold, I believe, that in a severe laceration of the cervix attended by hemorrhage their graduates are qualified and competent, and are taught to close such lacerations by the immediate application of sutures If I am mistaken in that, will someone correct me? It is my teaching, that those persons who graduate at the present time at the Jefferson Medical College, Philadelphia, shall apply an aseptic chromicized catgut suture to a severely torn cervix, and do it at once. If I am correct in representing the views of my colleagues on that point it is quite common to close aseptically such lacerations as my paper has described.

Dr. Dickinson.—The gentleman who said that the shapeless pocketing and flabbiness of the cervix represented in the frozen sections as existing on the first day of labor did not present clinical conditions has doubtless never had difficulty in putting in stitches after labor in these cervices. He has not had difficulty in straightening out these pockets before getting gauze into the uterus. These are both post-mortem and antemortem findings.

I am sorry that the very careful limitations I made in reference to treatment were not understood. I beg to repeat that the fifth day repair of the cervix is strictly limited to patients so exhausted that an elaborate operation for repair of the pelvic floor and cervix cannot be done immediately after labor; furthermore, to such cases where the surroundings and conditions are such as to preclude careful operative work. In extensive repair of the perineum for tears extending into the

vaginal walls, or tears running up above the internal os, as Dr. Edgar has described them, I think it is wrong to defer repair until the end of the puerperium, and put the woman back in bed two or three weeks, when we only have to wait a few days for her to recover sufficiently. Then we can cope with a badly torn zigzag injury of the pelvic floor with ease. I have limited the fifth-day repair of the cervix to that class of cases, and I have heard nothing advanced in the discussion why in that small and particular class of cases such time should not be chosen for such an operation.

Dr. Baldy.—I am not in sympathy with those who advocate immediate repair of the lacerated cervix, nor have there been any arguments advanced which would influence me to sympathize with those who advocate the repair of a torn cervix at the end of five or seven days. I would emphasize what Dr. Cragin has said.

As to the remarks of Dr. Davis concerning the general practitioner, I prefer to accept the situation as it is. I do not think the student exists who can repair these lacerated cervices properly without great danger to the patient. If the teaching goes out to the profession that medical students as well as undergraduates should give immediate attention to the repair of these lacerations it will prove disastrous. It is extremely dangerous to teach that a lying-in woman should have a lacerated cervix repaired immediately after labor. Secondary tears of the cervix do harm, but not always. The cervix is sometimes large, with an enlarged fundus, but often we have an enlarged cervix with no enlargement of the fundus. Although endometritis exists, in the vast majority of cases, as stated by Dr. Watkins, there are cases of secondary conditions in which it does not exist.

Dr. Wakefield misunderstood me. The class of cases in which I recommend operation are those in which there is infiltration, eversion of the lips of the cervix, erosion, etc. The indications for operation on these cases were clearly laid down by Emmet, and you will find, if you follow his teaching closely, that he had little or no sympathy with the carcinomatous theory of laceration of the cervix. I have heard nothing advanced scientifically in this discussion which would alter my opinion in regard to carcinoma developing in the angles, and the only two things

mentioned as causes of carcinoma developing at the site of a lacerated cervix were friction and irritation. Rub skin surfaces together and you produce friction; but mucous and serous surfaces have no such friction. We theorize, we advance beliefs, but we furnish no proofs to back them up. I have very little respect for beliefs unless they are supported by indisputable evidence. I find nothing in the literature which convinces me that cancer develops purely from friction, or, in fact, that friction has anything whatever to do with the production of cancer.

Dr. Gordon said that he has not seen cancer in a nulliparous woman. I have seen half a dozen such cases in my professional life, and I believe most of the members have reported such cases from time to time. If I believed that laceration of the cervix had anything to do with cancer I would not hesitate to repair every laceration that came under my observation. I, however, do not so believe.

RUPTURE OF THE UTERUS—SUPRAVAGINAL.

By Malcolm McLean, M.D.,
New York City.

"Personal acquaintance," as it has been called, with the rare accident of rupture or laceration of the uterine body is necessarily so limited that anything like comprehensive and definite opinion as to treatment must be offered with considerable diffidence and modesty.

It is the desire and purpose of the writer, therefore, to confine the material of this very meager paper to a consideration of certain problems presenting in such cases as most frequently confront the obstetrician, and in which he has had more or less personal experience. It is intended to deal with the question of the proper treatment of recent or immediate accidents in which the rupture is confined to the supravaginal portion of the uterus, leaving, generally, out of the field of study those cases which chiefly involve the vaginal portions. Furthermore, the special object of this paper is to call attention more particularly to those cases of rupture which may be called spontaneous—that is, cases which are not necessarily due to external traumatism.

Immediately upon the manifestation of the symptoms of uterine rupture we must ascertain, if possible, the location, direction, and extent of the wound; the relations of the fetus and its appendages to the uterine cavity, as well as that of the peritoneum, and determine as nearly as possible the amount of active internal hemorrhage. It is necessary to detect any possible escape into the uterine wound of any portion of the intraperitoneal organs, especially the intes-

tines. It is very important, also, to ascertain whether the child is still living—either in the proper obstetric cavity or in part or in whole within the peritoneal cavity. Furthermore, it is very desirable to know at what point, if at all, the fetal envelope has been torn, and, in case the membranes have already been ruptured in the natural progress of the second stage of labor, whether that opening into the amniotic sac be the only opening. We must estimate as carefully as we may the size of the uterus after rupture as compared with its dimensions immediately preceding the accident. It is of great importance that we assure ourselves of the relative proportions of the pelvis, making sure that we do not overlook any considerable deformity or any impinging or obstructing tumor which may have diminished the diameters of the passage at any point.

The general condition of the patient herself must be carefully observed, of course, watching closely the evidences of nervous shock, hemorrhage, etc.

The position and condition of the child will demand our instant observation, and as quickly as possible we should decide upon a course of action for its delivery. We should promptly determine whether we can and should deliver by the natural passages, and, if so, whether manual or instrumental means may best be employed. It may be generally stated that in the majority of cases where so much as one entire limb of the child remains *in utero* in the presence of a comparatively normal obstetric canal, it should be delivered through the vagina. This procedure will be found practicable in those cases where prompt action has followed the accident—before the uterus takes on a tonic contraction. In cases in which the head continues to be the presenting part, and where it can be pushed down from without by manual pressure so as to easily engage below the brim, the forceps should be applied while the uterus and fetus are carefully steadied by an assistant's hands on the mother's abdomen and delivery accomplished. But in many cases the

recession of the presenting part after rupture will have involved a radical change in the presentation, so that an arm, shoulder, or foot may be substituted; or the whole fetus may have so far receded as to leave no definition of the probable presentation. Under these circumstances it is necessary to introduce the hand cautiously but rapidly, and so manipulate the child as to draw it into the cavity without enlarging the wound in the uterine wall, and thence downward by podalic version through the vulva.

If practicable, without involving too much delay and manipulation, we should, while reaching for the child, ascertain the location, extent, and condition of the uterine wound. If it be found in the lateral intraligamental portion, with the peritoneum merely lifted up, as a rule the case may be treated expectantly, making such provision against shock and hemorrhage as to tide the patient over the first great dangers. In these cases extensive intraligamental hematomata may be expected, and evidences of bloody infiltration of the parietes of the abdomen may often be found even as high as the inframammary region. Even under these conditions recoveries will sometimes take place under favorable circumstances.

The same may be said of ruptures higher up toward the fundus, where the peritoneum has remained intact and has not been detached too extensively from the uterus in the vicinity of the rupture. But such ruptures are apt to be associated with or rather continuous with a transverse laceration lower down, thus involving an extensive destruction of tissue and making hemorrhage a formidable accident or complication. In selected cases, however, cases where a smooth delivery has been accomplished, and the uterus gives hopeful signs of good condensation, we may with propriety treat the accident without resorting to abdominal section.

In a third class of cases the rupture will be found complete, involving opening into the peritoneal cavity. Here it becomes a question of great moment just how far and by what foreign material the peritoneum has been invaded.

Has blood alone been effused into that serous cavity, or has amniotic material with meconium been forced into its folds? This we may in some cases clearly determine, and on that determination will in certain cases depend our decision as to interfering by abdominal section. It is just here that our examination of the continuity of the amniotic sac walls proves of so much value. If we find that the membranes are intact and thrust out through the wound in the uterine wall in front of the escaping fetus, we may in certain cases feel content to leave the case to nature's efforts at repair after the delivery of the child and the appendages. Especial attention is asked to this point, as it is not based upon a fanciful hypothesis, but upon actual experience in the conduct of such a case. Observe that in such a case the uterine rupture is complete, opening freely enough into the peritoneal cavity to allow of the escape of two-thirds or more of the fetus from the cavity of the womb, and yet neither the fetus itself nor the detritus of the amniotic contents have come in contact with the peritoneal cavity, for the amniotic sac has acted as an impervious envelope to the fetus and has formed a sort of hernial sac about it, shutting out all of the uterine contents, except a quantity, more or less extensive, of pure blood.

In one case, already recorded by the writer, the uterus ruptured badly during the normal progress of the second stage, the laceration extending partly within the right broad ligament obliquely upward, anterior to the right tubal junction. The child instantly receded, and was extruded through the laceration so that its feet were kicking under the skin at the liver border. Internal examination showed the head and one arm only remaining in the womb. Feeling rapidly about the edges of the torn uterus it was distinctly evident that the rest of the child was in a sac formed by the extraverted amniotic membranes, the wound edges everywhere being lined with the slippery tissue.

The child was at once drawn back into the womb and delivered by the feet. It had been dead some minutes before

the operation. Immediately on delivering the placenta and membranes the ovisac was carefully examined and found to be intact everywhere except at the dependent portion, where the membranes had originally ruptured in the uterine mouth in the usual manner. Assuming from these facts that the peritoneum had been invaded only by extravasated blood, the case was left to nature, and the recovery was complete. The writer had the privilege of delivering this same patient within two years afterward, the labor progressing normally until expulsive pains began, when it was deemed wise to terminate the labor by early forceps. No accident occurred. The thick scar of the original uterine rupture was so prominent as to be easily detected during labor.

In all operations and examinations *in utero* in case of rupture it is a point of importance to keep within the amniotic sac, and not to allow the hand or instruments to cause a solution of continuity of that membrane, for this precaution will not only preserve a valuable evidence as to the probable invasion of the peritoneum, but will also protect the uterus from possible infection from without.

Finally, there are cases in which the invasion of the peritoneal cavity is ruinous, the child and its envelopes even being thrust out of the womb. Such accidents almost uniformly occur in the presence of deformed pelves, and abdominal section is the only safe procedure. As a rule, the uterus will be found so rudely torn as to make repair wellnigh an impossibility. Therefore, one of the methods of hysterectomy must be adopted and the case treated in the usual manner.

In all of the cases in which delivery has been accomplished as above described the writer urges the free use of hot water irrigation per vaginam, believing that he has witnessed repairs under such circumstances which would have failed without it. In the presence of this awful accident in obstetrics we should strive to so act as to not jeopardize the patient's life by too strenuous surgical exploits nor by an inactivity which is not masterly.

SUBPERITONEAL HEMATOMA FOLLOWING LABOR NOT ASSOCIATED WITH LESIONS OF THE UTERUS.

By J. Whitridge Williams,
Baltimore.

By the term puerperal hematoma one understands the effusion of a greater or lesser quantity of blood into the connective-tissue spaces of some portion of the genital tract or into the structures immediately adjacent to it, in contradistinction to hematocele formation, in which the blood is poured out into the peritoneal cavity and then becomes encapsulated. Hematomata are classified as vulval, perineal, vaginal, and subperitoneal or broad ligament, according to their point of origin.

The vulval and perineal variety has long been familiar to medical men, although the first authentic description was given by Rueff in 1554. From that time until the early part of the eighteenth century only occasional reference was made to the subject, Kronauer in 1734 being the first to devote special attention to it. With the exception of reports of isolated cases no further contribution was forthcoming until 1797, when the summary of Casaubon appeared. This was soon followed by the dissertations of Audibert, Siebenhaar, and the reports of Joerg, Chaussier, Dewees and others; but it was not until the appearance of Deneux's admirable monograph in 1843 that general attention was directed toward the condition.

Vulval hematomata or thrombi usually make their appearance shortly after labor, though occasionally they occur

before the birth of the child, and still more rarely in the latter months of pregnancy; they are occasionally encountered in non-pregnant women whose external genitalia have been subjected to some kind of traumatism. The condition is usually limited to one labium majus, though in extreme cases the effusion of blood may extend into the perineum and buttocks, and in very rare instances, as in the case of Bessel-Hagen, over the lower portion of the anterior abdominal wall. Such hematomata vary markedly in size, but are not of serious prognostic import unless they attain immense proportions, when their rupture may give rise to fatal hemorrhage.

The first occurrence of this kind was recorded by Casaubon, in whose case the hematoma followed a kick in the last month of pregnancy and, rupturing, gave rise to fatal hemorrhage, the child being saved by a postmortem Cesarean section. In not a few cases, particularly in preantiseptic times, even though fatal hemorrhage did not occur, the rupture opened a portal of entry for an infection which frequently led to death. Occasionally, when the condition occurs during the course of labor, the swollen labia may so occlude the genital canal as to render the delivery of the child impossible until the contents of the hematoma have been evacuated; while when the condition develops postpartum the obstruction may be so marked as to cause the retention of the lochial discharge.

Vaginal hematoma, in which the collection of blood occurs in the connective tissue surrounding the vaginal wall, but beneath the pelvic fascia, were not recognized until a later period, the case of Peu, in which the condition was mistaken for an inverted uterus, being one of the first reported. Such structures may attain considerable size, and when occurring during labor may obstruct delivery and during the puerperium cause a damming back of the lochia. They occur less frequently than the vulval variety.

Subperitoneal hematomata, in which the collection of

blood lies beneath the peritoneum, but above the pelvic floor, are still less frequent and usually follow incomplete rupture of the uterus or deep cervical tears, though in a small number of cases, such an association is lacking, and the hemorrhage results from the rupture of vessels within the broad ligament in the neighborhood of the supravaginal portion of the cervix or about the base of the bladder. As far as I have been able to ascertain, the first case of this character was reported by Baudelocque. In not a few instances a similar condition may follow the rupture of a pregnant tube between the folds of the broad ligament; while in non-pregnant women subperitoneal hematomata may follow injuries to bloodvessels or the surrounding viscera in curetting the uterus, removing tumors, and occasionally occur after very violent coitus.

In this paper I desire to leave out of consideration all forms of hematoma except those following labor in which there was no injury to the uterus and in which the collection of blood is bounded above by the peritoneum and below by the pelvic floor.

The first case of this character was observed by Baudelocque and described in Casaubon's paper of 1797. Since then a small number of similar cases have been recorded, although they do not appear to have been clearly differentiated from vulval and vaginal hematomata until the appearance of Deneux's monograph in 1834, in which attention was first directed to the part played by the pelvic fascia, whose function was abundantly confirmed and elaborated by the later work of Laborie, Perret, and Schlesinger.

The object of this paper is to describe a case of subperitoneal hematoma which I saw last November, after which certain points in the literature upon the subject will be considered.

I was asked to see the patient at 10 P.M. November 2, 1903, by Doctors H. L. Smith and O. P. Penning, who believed that they had to do with a concealed hemorrhage.

The patient, a twenty-eight-year-old primipara, had passed through an uneventful pregnancy and had been delivered of a small child by another physician after an easy low forceps operation, which was performed without anesthesia. The placental period was uneventful, although almost immediately after its conclusion the patient began to complain of intense tearing pain in the neighborhood of the rectum. As an external examination revealed nothing abnormal, her physician attributed the suffering to after-pains, for which he administered a hypodermic injection of morphine. This somewhat relieved the patient, whom he left in good condition an hour and a half after the birth of the child.

Shortly afterward the pain became much more severe and extended into the lower abdomen, the patient at the same time becoming weaker and pallid in appearance. As the physician who had delivered her could not be reached. Doctors Smith and Penning were summoned. They found the patient very blanched and gasping for breath. As the uterus was firmly contracted and there were no signs of external hemorrhage, they considered the possibility of internal bleeding, and at once administered 500 c.c. of sterile salt solution subcutaneously and gave the usual stimulants by the mouth.

When I saw the patient she was perfectly conscious and complained of intense pain about the rectum. She presented all the signs of acute anemia, the pulse being 144, weak and thready. There was no discharge of blood from the vagina and only a slight perineal tear. On palpating the abdomen, the firmly contracted fundus of the uterus was felt at the level of the umbilicus, and beneath it filling out the entire lower abdomen was a firm, rounded, slightly fluctuant tumor, somewhat sensitive on pressure, which extended from three fingers' breadth below the umbilicus to the symphysis pubis. At first glance it appeared to be the tensely distended bladder, but upon catheterization only a few cubic centimeters of bloody urine escaped.

On vaginal examination, the external os was found intact, and just above the level of the promontory of the sacrum. The entire left and posterior portion of the pelvic cavity was filled out by a firm tumor which extended from the cervix to the pelvic wall and depressed the lateral and posterior fornices downward. On percussing the lower part of the abdomen a distinct wave of fluctuation was transmitted to the vaginal fingers.

As there was no tear of the cervix or vaginal fornix, I made a provisional diagnosis of an incomplete rupture of the uterus, with hemorrhage between the folds of the broad ligament. In view of the patient's condition, which was steadily growing worse, it seemed that the best chance of saving her life would be offered by an abdominal section, when the hematoma could be emptied and the uterus sutured or removed as seemed best at the time.

The necessary instruments and appliances were accordingly sent for and preparations rapidly made for the operation. This naturally caused some delay, and by the time the patient had been placed upon the table in Trendelenburg's position, her condition had become so much worse that the pulse could not be counted at the wrist. Accordingly, an intravenous injection of sterile salt solution was commenced as soon as the anesthesia was started.

An abdominal incision was made from the umbilicus to the symphysis. After cutting through the fascia in the linea alba, a dark, blood-stained tissue came into view, which broke down readily under the fingers, but did not come in contact with the peritoneum except for a distance of 5 cm. just beneath the umbilicus. Accordingly, the peritoneal cavity was opened in the latter location and the abdominal incision extended a few centimeters above the umbilicus. After packing back the intestines with compresses, the uterus was seized and drawn up into the wound, and upon inspection was found to be perfectly intact, as were likewise the tubes and ovaries, the corpus luteum being on the right side.

Lying in front of the uterus was the contracted bladder, the peritoneal covering of which presented an ecchymotic appearance. On careful examination with the hand in the abdominal cavity, it was found that the tumor lay beneath the peritoneum and in front of and below the uterus and bladder.

To avoid contamination, the peritoneal incision was immediately closed with a continuous suture, after which the loose blood-stained tissue beneath it in the midline was bluntly dissected with the fingers, which suddenly entered a large cavity filled with fluid and clotted blood. The contents were removed as rapidly as possible, when I found that I had to deal with a cavity which measured 10 cm. in its transverse and 15 cm. in its vertical diameter, and extended from three fingers' breadth below the umbilicus to the pelvic floor. Anteriorly it was bounded by the symphysis pubis and the anterior abdominal wall and posteriorly by the anterior and inferior surface of the displaced bladder and the posterior fold of the left broad ligament. Inferiorly it extended to the pelvic floor, where the fingers came in contact not only with the lower margin of the symphysis pubis, but with the ischiopubic ramus; while laterally it had spread apart the folds of the left broad ligament, and pushed the cervix upward and to the right. To make sure that the lower uterine segment was not ruptured, the hand of an assistant was passed into the uterus and could be distinctly felt through its flaccid lower portion, which, however, presented no sign of a tear.

After carefully sponging out the cavity it was found that its walls presented a jagged, blood-stained appearance and that the hemorrhage came from an oozing surface upon the inferior and anterior portion of the bladder, in which no large bleeding vessels could be seen. As it appeared impossible to arrest the hemorrhage by the application of sutures, the cavity was tightly packed with iodoform gauze, which was brought out at the lower end of the incision, and a firm pack introduced into the vagina to make counter-pressure. The abdominal wound was then closed by through-

and-through silver wire sutures, its lower portion being left open for drainage. After the usual dressing, a tight abdominal binding was applied and the patient put back to bed, with a pulse of 140 and in a better condition than before the operation.

The recovery was gradual but uninterrupted. For the first few days there was considerable oozing from the wound, and when the pack was removed, four days after the operation, a sound introduced through the external wound penetrated 15 cm. before reaching the floor of the cavity. The wound closed rapidly, so that at each subsequent dressing a smaller quantity of gauze was employed, and soon all that was left was a small sinus which closed more gradually, the patient being dismissed perfectly cured two months after labor.

Since operating upon my patient I have looked over the literature upon the subject as thoroughly as possible, and find that this is the only case of the kind which has been treated by laparotomy. Possibly she might have recovered had she been treated in a purely expectant manner, but as she was rapidly becoming worse before the operation, and as the probable diagnosis was hemorrhage into the broad ligament following an incomplete rupture of the uterus, I believe that the treatment pursued was fully justified, and feel convinced, as far as is possible under the circumstances, that to it the patient owes her life. Whether a vaginal incision and tightly packing the cavity would have brought about the same result, I am naturally unable to state; but, in view of my experience with incomplete rupture of the uterus, it would appear very questionable.

After a careful search through the literature I have been able to collect 33 cases of subperitoneal hematoma following labor and not associated with rupture of the uterus. (See accompanying table.) The first case was observed by Baudelocque in 1778 and the last by Gustav Braun in 1902. The vast majority of the cases have been recorded by French

and German writers, for as far as I can learn, none have been reported in this country, and only two in Great Britain, namely, those of Glenn, and Purefoy, Lloyd and Carton.

Of course, the cases on record, in all probability represent only a small fraction of the total number observed, and it is likely that not a few cases which have been described as vaginal hematomata may belong in the same category. Moreover, it is quite possible that a certain proportion of the deaths occurring shortly after labor and attributed to syncope may have been due to the same cause.

It is interesting to note the large amount of blood which was poured out in some of these cases, eighteen of which came to autopsy. In many the hematoma attained immense proportions, the peritoneum being dissected up to such an extent that the blood came to lie in the iliac fossæ, and frequently extended up along the psoas muscle to the region of the kidneys and occasionally to the roots of the diaphragm. In not a few cases the mesentery of the large intestine was dissected up, thus adding to the extent of the hematoma.

On studying the clinical history of these cases a number of interesting and suggestive points were noted. In the first place, one is impressed with the surprising frequency with which primiparous women are affected. On analyzing the cases recorded in the literature it is found that in nine no statement was made as to the number of children which the patient had borne, but that 62.5 per cent. of the remaining cases occurred in primiparæ.

Moreover, it is a matter of surprise, and in marked contrast to the course of labor preceding the formation of hematomata due to incomplete rupture of the uterus, that in the vast majority of cases the delivery was easy and spontaneous. Thus, in the 33 cases the course of labor was given as follows: spontaneous, 24; version, 4; forceps, 2; no data, 2; not delivered, 1; so that out of the 30 cases in which data were available, 24 were spontaneous—80 per cent.

Date.	Author.	Age.	Para.	Pelvis.	Presentation.	Course of labor.	Weight of child.	Location of hematoma.	Outcome.	Operation.	Autopsy.	Remarks.
1778	Baudelocque	...	.....	Rachitic. 2½ in.	Head.	Difficult version.	.....	Right side.	Death.	None.	Yes.	Rupture into vagina; no tear of uterus.
1806	Jörg	36	I.	.....	L.O.I.P.	Spontaneous.	.....	Left side	Recovery.	None.	No.	Extended below into left labium majus.
1809	Chaussier	...	I.	.....	Head.	Spontaneous.	.....	Right iliac fossa.	Death.	None.	Yes.	Due to rupture of right psoas muscle.
1824	Chaussier	30	I.	.....	?	Not delivered. 5 months pregnant	.....	Right side	Death.	None.	Yes.	Extended up to right kidney; due to right side.
1824	Chaussier	...	I.	.....	Head.	Spontaneous.	.....	Right side	Death.	Labial tumor opened.	Yes.	Extended from labium majus to kidney.
1825	Lachapelle	...	.....	.....	Head.	Spontaneous.	.....	"Side of vagina."	Recovery.	None.	No.	Ruptured during examination.
1828	Ulsamer	20	I.	.....	Head.	Spontaneous.	.....	Began in perineum.	Recovery.	None.	No.	Spontaneous rupture externally.
1834	Deneux	28	I.	.....	Head.	Spontaneous	7 lbs.	Right side.	Death.	None.	Yes.	Spontaneous rupture into vagina.
1834	Boer	28	I.	.....	Head.	Spontaneous.	Usual size.	Right side	Recovery.	None.	No.	Rupture into vagina; hematoma extended up to ant. superior iliac spine.
1843	Lubanski	26	I.	.....	Head.	Spontaneous.	Usual size.	Right side.	Death.	Vaginal incision.	Yes.	Filled entire pelvic cavity, spread about mesentery of large intestine.
1846	Cazeaux	...	.....	.....	Head.	Spontaneous.	.....	Right side.	Death.	None.	Yes.	Extended up to lower part of diaphragm.
1853	Depaul (Blot)	18	II.	.....	Head.	Spontaneous.	2750 gm	Left side.	Death.	Incision.	Yes.	Extended into iliac fossæ and up to diaphragm.

1855	Chiari, Braun, and Spaeth	26	I.	.....	Head.	Spontaneous.	.....	Right side.	Death.	None; spontaneous rupture into vagina	Yes.	Filled pelvic cavity and extended up along psoas muscle as far as kidney.
1860	Laborie	26	I.	.....	R.O.I.A	Spontaneous.	.....	Right side.	Death.	Vaginal incision.	Yes.	Extended up to right kidney.
1863	Breslau	33	VII.	.....	Head.	Spontaneous.	.....	Recto-vaginal septum.	Recovery.	Vaginal incision.	No.	Operation fifty-six days after labor; 500 c.c. blood.
1864	Perret	20	I.	.....	L.O.I.A.	Spontaneous.	3250 gm	Left and posterior.	Death.	Vaginal incision.	Yes	Extended up to renal region.
1864	Perret	22	I.	.....	Breech.	Spontaneous.	2800 gm	Left side.	Death.	None; spontaneous rupture.	Yes.	Extended up to left kidney.
1864	Perret	...	I.	.....	Head.	Spontaneous.	.....	Right and posterior.	Death.	None; spontaneous rupture.	Yes.	Extended up above superior strait.
1864	Perret	23	I.	.....	Head.	Spontaneous.	3200 gm	.....	Death.	None; spontaneous rupture.	Yes.	Subperitoneal infiltration in lower part of abdomen
1865	Helfer	35	III.	.....	Head.	Spontaneous.	.....	Left side.	Death	None; spontaneous rupture.	Yes.	Limited to pelvic cavity.
1865	Hugenberger	28	III.	Rachitic. 7.5 c m.	Head.	Difficult forceps.	8 lbs.	Right side.	Death.	None.	Yes.	No tear of uterus or vagina; hematoma extended up to renal region.
1865	Hugenberger	36	IV.	.....	Transverse.	Difficult version.	.....	Right side.	Death.	None.	Yes.	Secondary rupture into peritoneal cavity; no lesion of uterus or vagina

Date.	Author.	Age.	Para.	Pelvis.	Presentation.	Course of labor.	Weight of child.	Location of hematoma.	Outcome.	Operation.	Autopsy.	Remarks.
1884	Schlesinger	24	I.	.....	Head.	Slow, spontaneous.	.....	Filled pelvis.	Recovery.	None; spontaneous rupture.	No.	
1891	Ter-Gregoriantz	...	III.	.....	Head.	Slow, spontaneous.	Large.	Right side.	Recovery.	None; spontaneous rupture.	No.	Filled pelvis; suppurated.
1893	Winckel	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	No details; merely says it was like cases of Cazeaux and Hugenberger.
1894	Stadfeldt	all y'ng	.....	.....	.....	All spontaneous.	2900 3180 3680 3560	.....	All recovered	All incised from vagina and packed.	No.	
"	"											
"	"											
"	"											
1897	Glenn	28	.....	.....	Head.	Forceps.	.....	Filled pelvis and extended up to lower border of ribs.	Recovery.	None.	No.	Excluded rupture of uterus or vagina; expectant treatment; five months later size of fetal head.
1901	Purefoy, Lloyd, and Carton	...	Multipara.	.....	....	5 months abortion.	.....	Left side.	Recovery.	None.	No.	Left-sided ovarian cyst removed four years previously; reopened for hemorrhage; since then hematoma with each pregnancy.
1901	Leopold	34	III.	Rachitic, 8 c.m.	Head.	Difficult version.	.....	Right side.	Death.	Tampon of vagina	Yes.	Rupture into peritoneal cavity; 1500 c.c. blood; no injury of uterus or vagina.
1902	Braun	26	III.	.....	Transverse.	Decapitation.	.....	Left side, extended up to margin of ribs.	Recovery.	None.	No.	In most serious condition for sixteen days.

It is also interesting to note that the children were somewhat smaller than usual; since, with the exception of the case of Ter-Gregoriantz, in which it was stated that the child was large, the heaviest child did not exceed eight pounds, while the majority weighed less than seven pounds.

The mortality was extremely high, as of the 32 cases concerning whose termination data were available, 18 ended fatally, a mortality of 56 per cent. As there was only a single death in the 11 cases which occurred after the introduction of modern surgical methods (1880), it would appear reasonable to infer that a considerable proportion of the previous mortality was due to puerperal infection. Moreover, the probability of infection was markedly increased whenever the hematoma communicated with the vaginal canal, no matter whether the result of spontaneous rupture or incision. This is clearly shown by an analysis of the cases. Thus, of the 22 cases occurring prior to 1880, 9 ruptured spontaneously into the vagina, and 6 were incised, 6 of the former and 5 of the latter dying, a mortality of 73 per cent.; while in the 11 cases which occurred subsequently to that period, there were 2 spontaneous ruptures and 4 incisions, all of which recovered.

In not a few cases, however, the actual cause of death was acute anemia, as in the cases of Chaussier, Cazeaux, Hugenberger and others, in which death resulted from exhaustion consequent upon the escape of blood into the closed hematoma sac. On the other hand, in one of Hugenberger's cases and another reported by Leopold the sac ruptured secondarily into the peritoneal cavity, with rapidly fatal hemorrhage.

Etiology. The earlier writers upon the subject were inclined to attribute the hemorrhage to the rupture of varicose veins in the broad ligaments. The evidence in favor of such an occurrence, however, is extremely questionable, and, with the exception of Budin, finds no supporters among modern writers. Accordingly, if it occurs at all, it must play but an insignificant part.

In two of Chaussier's cases the origin of the hemorrhage was extremely interesting; in one the condition occurred in a woman five months pregnant during a very jolting ride in a wagon over a rough road; while in the other the hematoma resulted from the rupture of the right psoas muscle in a woman who was extremely unruly throughout labor and who could not be prevented from throwing herself continuously about the bed with great violence. In Schostak's case, which I have not included in the table, the condition apparently followed a violent coitus eight days before the onset of labor, the hematoma forming a serious obstacle to the descent of the child. In the case of Purefoy, Lloyd, and Carton the condition followed a spontaneous abortion at the fifth month in a woman who had previously submitted to an ovariotomy, at which time the vessels of the broad ligament were noted to be extremely varicose, and after which a second laparotomy was necessary to check hemorrhage from a loosened vessel. It is interesting to note that a hematoma developed after each pregnancy following the operation four years previously, but unfortunately in their short account of the case the authors have failed to give any particulars.

At first glance it would seem natural to suppose that the condition usually results from violence at the time of labor. Careful study of the reported cases, however, would apparently indicate that such is not the case; since 80 per cent. of the labors were spontaneous and in only one was the child of excessive size. Moreover, in only four cases was the extraction of the child attended by any particular difficulty, namely, the cases of Baudelocque, Hugenberger, Leopold, and Braun, in all of which difficult version and extraction were necessary, the operation being complicated by the presence of a contracted pelvis in all but Braun's case.

For a long time there was considerable discussion as to whether the hemorrhage giving rise to the hematoma was of venous or arterial origin, and it is to Perret that we are

indebted for precise information upon this point. At the autopsy upon one of his cases, he showed by injection experiments that the hemorrhage was capillary in character, as the fluid slowly oozed from various points of the wall of the hematoma, no matter whether the injection was made into veins or arteries. Likewise, in my own case, it was clearly seen that no large vessels were involved, but that the hemorrhage was merely a capillary ooze from the anterior and inferior surface of the bladder.

In view of his observations, Perret concluded that the accident did not result from the injury of large vessels, but rather was due to the tearing through of smaller ones by the tissues of the birth-canal being slowly dragged off from their attachments by the friction exerted by the oncoming presenting part. Such a mechanism would afford a satisfactory explanation for the greater frequency of the accident in primiparous women, in whom the rigidity of the tissues and smallness of the parts would render such an occurrence far more likely than in the relaxed genital canal of a multipara.

Croom has advanced a somewhat similar explanation for the production of vaginal hematomata. In four cases of this character which he observed, dystocia resulted from a markedly pendulous abdomen, and labor did not progress until the anteflexed uterus had been replaced and maintained in position by a bandage. He held that in his cases undue traction was exerted by the displaced cervix upon the posterior vaginal wall, which then became gradually separated from its attachments. The hemorrhage, however, did not occur until the pressure exerted by the presenting part was done away with. It would therefore seem that the accident while rare is occasionally unavoidable and is due to conditions inherent to the mechanism of labor rather than to violence exerted by the physician.

Diagnosis. The first symptom which should direct one's attention to the possibility of such an accident is the occur-

rence shortly after labor of severe, tearing pain about the rectum and lower abdomen in the absence of any visible lesion. Accordingly, in a primiparous woman such symptoms should not be attributed to after-pains until the possibility of hematoma formation has been eliminated by a careful examination. Following the pain the patient may pass into a condition of collapse, which naturally becomes more severe the greater the amount of hemorrhage.

Another important diagnostic point is the elevated position of the fundus, which lies above the umbilicus instead of about midway between it and the symphysis, which is due to the uterus being pressed upward by the tumor mass.

Vaginal examination, as a rule, will enable one to determine whether the hemorrhage lies within the broad ligament or at least is subperitoneal, for if made shortly after the occurrence of the accident, a tumor will be found depressing one or both vaginal fornices and Douglas' cul-de-sac and extending directly outward from the cervix toward the pelvic wall. Of course, under such circumstances it is impossible to distinguish the condition from a hematoma following an incomplete rupture of the uterus, without a careful exploration of the lower uterine segment; although the fact that the labor was spontaneous and easy should naturally cause one to suspect that it was not associated with a rupture; whereas, if the labor was difficult, and particularly if severe operative procedures were undertaken, the probability of such an accident should be seriously considered.

Treatment. In the vast majority of cases the treatment should be purely expectant and the attempt made to tide the patient over the emergency by the subcutaneous use of intravenous salt solution and the administration of the ordinary stimulants. If, however, the tumor increases rapidly in size and the collapse becomes more pronounced, I believe that the best means of coping with the hemorrhage is by laparotomy, when the condition can be thoroughly inspected and appropriate means adopted for checking the

flow of blood. It seems to me that such a mode of treatment is greatly superior to attacking the hematoma from below, as under such circumstances all that one can do is to pack the wound in the dark and then be haunted with the fear of not having successfully checked the bleeding and the possibility of a secondary rupture into the peritoneal cavity.

On the other hand, if the patient is not seen until some time after the occurrence of the accident, when the acute symptoms have subsided, or the clinical picture points toward the occurrence of suppurative changes, attack by the vaginal route would appear preferable, as under such circumstances the danger of fresh hemorrhage is minimal, while the possibility of contaminating the peritoneal cavity is done away with.

LITERATURE.

Audibert, L. P. H. Dissertation sur l'epanchement sanguin qui survient aux grandes lévres ou dans l'intérieure du vagin pendant le travail ou à la suite de l'accouchement. Thèse de Paris, 1812.

Baudelocque. (See Casaubon.)

Bessel-Hagen. Ueber Haematome in der Unterbauchgegend und an den äusseren Geschlechtstheilen des Weibes and über Spontanperforation des Haematocolpos bei Atresia vaginæ hymenalis. Arch. f. klin. Chirurgie, 1889, xxxvii. 277–299.

Blot, H. Des tumeurs sanguines de la vulve et du vagin pendant la grossesse et l'accouchement. Paris, 1853, p. 112.

Boer, L. J. Ueber eine noch unbeschriebene Art von Blutfluss bei Gebärenden. Sieben Bücher über naturliche Geburtshülfe. Wien, 1834, 244–253.

Braun, G. Ein kolossales Haematom. Centralbl. f. Gyn., 1902, p. 195.

Breslau. Beitrag zur Kenntniss der Haematocele pelviterina. Schweizerische. Zeitschr. f. Heilkunde, 1863, ii. 297–329.

Budin. Des varicés chez la femme enciente. Thèse d'aggrégation. Paris, 1880, p. 164.

Casaubon. Sur les tumeurs sanguines à la vulve. Receuil periodique de la Société de Santé de Paris, 1797, i. (An. V.), 455–74.

Cazeaux. Traité de l'Art des Accouchements. III. ed. Paris, 1850 p. 639.

Chaussier. Rupture des muscles psoas, avec épanchement sanguine souls le péritoine, pendant l'accouchement. Bull de la faculté de méd. de Paris. Paris, 1809, ii. p. 54.

Chaussier. Considérations médico-légales sur l'ecchymose, la sugillation, la contusion, la meurtrissure. Receuil de mémoires, consultations et rapports sur divers objects de médecine legale. Paris, 1824, 397–401.

Chiari, Braun, and Spaeth. Klinik der Geburtshülfe und Gynäkologie. Erlangen, 1855, 219–224.

Croom, J. H. On the Etiology of Vaginal Hæmatoma occurring during Labor. Edinburgh Medical Journal, 1888, xxxi. 1001–1005.

Deneux, C. Mémoire sur les tumeurs sanguines de la vulve et du vagin. 1830, Paris, pp. 188.

Depaul. (See Blot).

Dewees, W. P. Observations upon Bloody Infiltrations in the Labia Pudendi During or Very Quickly After Delivery, Illustrated by Cases. Philadelphia Journal of Medical and Physical Sciences, 1827, xiv. 1–9.

Glenn. Hemorrhage Into the Broad Ligament Complicating the Puerperium. British Medical Journal, 1897, ii. 219.

Helfer, F. W. Ruptur eines Varix in der Scheide. Monatsschr. f. Geburtskunde, 1865, xxv. (Supplement Heft), 77–85.

Hugenberger, T. Zur Casuistik der purperalen Blutergüsse ins Zellgewebe. St. Petersburger med. Zeitschrift, 1865, ix. 257–280.

Joerg. Geschichte einer Geburt und dabey erfolgter Zerreissung der Mütterschiede die aber ohne Operation geheilt wurde. Versuche u. Beiträge geburtshülflichen Inhalts. Leipzig, 1806, 232–241.

Kronauer. Dissertatio medico-chirurgica inauguralis de tumore genitalium postpartum sanguineo. Basileae, 1734.

Laborie. Histoire des thrombus de la vulve et du vagin spécialement aprés l'accouchement. Paris, 1860, pp. 55.

Lachapelle, Mme. Pratique des Accouchements. Paris, 1825, iii. p. 201.

Leopold. Uber Zerreissung eines parametranen Gefässes während der Geburt mit tödlichen Ausgang. Centralbl. f. Gyn., 1901, 1426–28.

Lubanski. Thrombus du vagin à la suite d'un accouchement naturel. Annales d'obstetrique, des maladies des femmes et des enfants. Paris, 1143, iii. 256–266.

Perret, F. H. J. Des tumeurs sanguines intra-pelviennes pendant la grossesse normale et l'accouchement. Thèse de Paris, 1864.

Peu. La pratique des accouchemens. Paris, 1694, 530–531.

Purefoy, Lloyd, and Carton. Clinical Report of the Rotunda Lying-in Hospital for the Year November 1, 1899, to October 31, 1890. Dublin Journal of Medical Sciences, 1901, cxi. 247–268.

Rueff, Jacob. Ein schön lustig Trostbüchle von der Empfengknussen und geburten der menschen/und jren vilfaltigen zufälen und hindernussen/mit vil unnd mancherley bewärter stucken unnd artzneyen/ouch schönen figuren/dazzu dienstlich/zu trost allen gebärenden frouwen/und eigentlichem bericht der Hebamen/erst nüwlich zusamen gelasen. Zurich, 1554.

Schlesinger, W. Ueber Blutgeschwülste des weiblichen Beckens. Wiener medizinische Blätter, 1884, Nos. 27, 28, 29, 31, 32, 33, 38, 43, 44, 46.

Schostak. Zur Entstehung der Haematocele. Ref. Frommel's Jahresbericht, 1901, xv. 301.

Siebenhaar. Observationes de tumore vaginae sanguineo ex partu oborto. D. I. Leipzig, 1824.

Stadfeldt. Die supra-fasciäre Beckenhämatome während Geburt und Wochenbett. Ref. Frommel's Jahresbericht, 1894, viii. p. 753.

Ter-Gregoriantz. Puerperales Hämatoma under der Douglas' schen Falte. Centralbl. f. Gyn., 1891, No. 37, pp. 754–55.

Ulsamer. Quoted by d'Outrepont. Beobachtungen u. Bemerkungen. Gemeinsame deutsche Zeitschrift f. Geburtskunde, 1828, iii, 436–439.

Winckel. Der Bluterguss in das Gewebe der äusseren Scham und Scheide. Thrombus s. Haematoma vulvae et vaginae. Lehrbuch der Geburtshülfe, ii. Auf., 1893, 722–28.

DISCUSSION.

Dr. Edwin B. Cragin.—There are one or two points in Dr. Williams' paper which seem to me of interest. In the first place, I do not believe these cases are quite so rare as he would give us to understand. I believe that a great many of the cases that are assigned to shock following labor are due, in reality, to incomplete rupture of the uterus. I could put on record two or three such cases that have not heretofore been published. One I remember very distinctly. A physician brought in a case with the report that he had attempted to deliver the woman with forceps while some member of the family was administering chloroform. She came out from under the influence of the chloroform before he was finished, raised herself from the bed, and let herself down on the forceps, producing an incomplete rupture of the uterus. There were two or three cases that happened at the Sloane Maternity, but all those which I have seen have been caused by some force either during delivery or by accident, not spontaneously, as reported by Dr. Williams, and I would be glad to emphasize this point, as I have never seen a case exactly like the one reported by him.

In regard to treatment, I cannot agree with Dr. Williams as

to the wisdom of abdominal section. Personally, I believe the thing to do is to carefully examine the woman while under an anesthetic, introduce the fingers into the rent and see whether or not the rent has extended into the peritoneal cavity. That is a distinguishing point. If the rent has gone into the peritoneal cavity, it is an indication for one thing; if it has not, it is an indication for another thing. Where the rent has not gone into the peritoneal cavity, especially if the vessels that are torn are not large, as he stated in his own case they were not, I believe the results are better if we clean out the clots and pack the cavity carefully with gauze.

Dr. Williams.—I am afraid some of the gentlemen have misunderstood the scope of my paper. The case which I reported and the thirty-three which I collected from the literature were cases of intraperitoneal hematoma not associated with rupture of the uterus. In all of these cases the bleeding came from vessels within the broad ligaments and pelvic connective tissue, and was not due to any lesion of the uterus itself.

Dr. Edward P. Davis.—As emphasizing a point made by Dr. Williams, these cases may happen from any traumatism during labor. I desire to report a case of hematoma of the broad ligament following hysterectomy for contracted pelvis. During the performance of the operation the hemorrhage from the broad ligaments was controlled by clamps. Following the hematoma the patient escaped infection and made a good recovery by absorption of the clots without further interference.

I think some of us have seen hematoma following dilatation of the womb in certain complicated cases. In a case in which the cervix had previously been completely repaired by a secondary operation, the woman having a placenta previa, I partially dilated the cervix with Bossi's dilator, extracted a living fetus of good size by extraction and version, and the patient sustained a laceration attended by profuse hemorrhage beneath the peritoneum to such an extent that she suffered from shock, with a fatal issue.

Dr. J. Clarence Webster.—I do not think the previous speakers have emphasized the interesting feature of Dr. Williams' case. It is that the uterus was not torn and that the hemorrhage occurred from the posterior or under surface of the bladder. I should like to ask Dr. Williams if any of the other observers,

who have reported a similar condition, referred to a similar source of bleeding?

Dr. Williams.—Yes, they have.

Dr. Webster (resuming).—We are familiar with the occurrence of hematomata from the rupture of a broad ligament vessel, uterine or ovarian; but this is new to me. I have never seen such a thing, and it is very interesting. He has pointed out that in the great majority of cases the condition has occurred in primiparæ. That is what one would expect. The hemorrhage in such a case must evidently come from the tearing through of the delicate strands of connective tissue between the cervix and the upper part of the vagina and bladder. When we remember the enormous disproportion which must occur during dilatation of the cervix and vagina, between the bladder and the attached cervix and vagina, it is not surprising that such a hemorrhage should occur, and to me the wonder is that it does not occur more frequently. In this connection I am interested in thinking of the cases in which vaginal Cesarean section is carried out. I have done that operation three times, and it is accompanied by extensive separation of the bladder, both from the upper part of the vagina and the cervix, and yet there has been very little hemorrhage to speak of. In closing the incision after the operation one cannot approximate the bladder to the cervix and vagina with sutures; they are simply allowed to lie in apposition, the cervix and vagina only being stitched. I should think, if there were risk of hemorrhage from the vessels in the posterior surface of the bladder, we might expect to find hematomata developing after vaginal Cesarean section, but I am not aware that any cases have been reported.

Dr. A. H. Buckmaster.—The condition described by Dr. Williams is probably not so rare as we have supposed, for we may not have been skilled enough to recognize it at the time. It is not at all uncommon to find these hematomata eight or nine days after labor, and to find a large mass occupying the position he has pointed out. I recall three such cases very distinctly, and each one of them must have been a case of the kind Dr. Williams has described. The absence of shock does not make this improbable. We know that at times we may have a large hematoma without great shock. The question of shock is a relative one.

Dr. Robert L. Dickinson.—I wish to put on record the case of a primipara, after easy labor, in whom a mass was found behind the pubes of about half the size of a fist. It started in front of the cervix, ran up the left side behind the pubes, apparently encircling the bladder on the left side. At first it was supposed to be a distended bladder, but later determined to be a clot. That absorbed without any further difficulty. The network of veins which is so prominent between the bladder and the uterus in removing large fibroids of the uterus would furnish an explanation of hemorrhage at that point. We know how troublesome that group of veins is sometimes in stripping the bladder away from the uterus when the bladder is elevated upon the uterus, and it would furnish a clue for the source of origin of these hemorrhages.

Dr. Williams.—In the first place, to make the matter perfectly clear, I should like to say that the subject under discussion was intraperitoneal hematoma not associated with rupture of the uterus. Had I included hematoma due to lesions of the uterus, I am sure that the members present could readily adduce a hundred or more cases of that character from their own experience, but the case reported was not associated with any such lesion.

In reply to Dr. Webster's question, I would say that the only writer who has made a similar statement as to the source of the hemorrhage was Perret, in a thesis upon the subject in 1864.

Had time permitted I hoped to take up the question of incomplete rupture of the uterus, and I shall here make a few remarks upon the subject. If I understand Dr. Cragin correctly, he advocates packing for incomplete and laparotomy for complete rupture of the uterus. My experience with the incomplete tears associated with hematoma formation has been very unfortunate, as all of the four cases which I have seen ended fatally. In each instance, with one exception, where no treatment was permitted, the tear was packed with iodoform gauze; but in spite of it the hemorrhage continued, and in two cases gave rise to large broad ligament hematoma, which subsequently ruptured into the peritoneal cavity, and I feel sure had laparotomy been performed in the first instance, that several of the women might have been saved.

I consider in cases of incomplete rupture of the uterus, which are not associated with hemorrhage, that packing may be a satisfactory method of treatment; but, on the other hand, when there is considerable bleeding, and particularly when it takes place in the folds of the broad ligament, that such a method of treatment is very uncertain, and it seems to me it is far better to open the abdomen, split open the capsule of the hematoma, tie off the bleeding vessels, or amputate the uterus as the case may be, than to put our hope in so fallacious an expedient as packing.

THE PREVENTIVE TREATMENT OF PELVIC-FLOOR LACERATIONS.

By J. Clifton Edgar, M.D.,
New York City.

Introduction. Pelvic-floor injuries comprise ruptures of the fourchet, posterior vulval commissure, perineum, lower third of the anterior, posterior, and lateral vaginal walls, and rectovaginal septum. The tissues involved may include the integument from the anal orifice to the posterior vulval commissure, the mucous membrane of the vulva, vagina, rectum, the cellular tissue, and the sphincter and levator ani muscles.

Preservation of the structures of the pelvic floor during the passage of the fetal head and shoulders has been placed by some authorities as second in importance only to preservation of the lives of the mother and child. From this standpoint it is possible to discuss the entire mechanism and conduct of labor, with the one aim in mind of favoring the pelvic floor under all circumstances when the more weighty conditions do not assert themselves. This has actually been done by Krantz in a lengthy monograph.[1]

The most important part of the management of the second stage of labor is the prevention of pelvic-floor lacerations. Lacerations of the fourchet in primiparæ and superficial tears about the vulval orifice in both primiparæ and multiparæ often occur, are often unavoidable, and usually readily heal, with simple asepsis. Deep lacerations are, I believe,

[1] Die Aetiologie de geb Dammvertet. zung. Wiesbaden, 1900.

avoidable in normal, ordinary cases of labor. The great importance of avoiding rupture of the pelvic floor cannot be overestimated. It is well known that a large proportion of gynecologic cases owe their condition directly or indirectly to rupture of the pelvic-floor muscles during labor. All of us are familiar with the published statistics of the obstetric clinic at Halle. Here we are told that the results of ten years' observation with every known method of perineal protection were lacerations extending beyond the commissure in 21.1 per cent. of primiparæ and 4.7 per cent. of multiparæ.

The factors which tend directly or indirectly to produce pelvic-floor lacerations are numerous, but for convenience we can arrange them in three major classes: (1) anomalies of the expulsive forces; (2) anomalies of the vaginal and pelvic-floor tissue; (3) faulty presentations and positions of the fetus, and faulty mechanism of labor.

These three major causes can be more concisely stated as follows:

(1) Too rapid expulsion of the fetus, so that tearing, instead of stretching, results. (2) Relative disproportion in size between the presenting part and the parturient outlet. (3) A faulty mechanism of labor, whereby larger circumferences of the head and shoulders than necessary pass through the parturient outlet.

1. Preliminary Digital Stretching of the Parturient Outlet. From clinical experience extending over a number of years, I can speak most enthusiastically of the preliminary digital stretching of the vulval outlet in primiparæ, and especially in elderly primiparæ, as a prophylactic measure in perineal protection. Of course, the method has been in use for years, but I would urge its more extended use in those cases in which the parturient outlet and the lower third of the vagina are small and rigid. I have obtained surprisingly good results by passing two fingers, palmar surface down, into the parturient outlet,

and making intermittent backward and lateral massage-like pressure. The motion is a sort of eccentric massage. I am accustomed to use two fingers of the same rather than of both hands for the purpose. The assistance of ether or chloroform is most valuable. Fifteen or twenty minutes of this firm outward and backward rotary massage-like stretching will usually enlarge sufficiently the most rigid parturient outlet.

I have demonstrated the method repeatedly to the Bellevue Hospital internes, and physicians in consultation practice, upon cases in which the birth of the fetus without entire loss of the pelvic floor at first appeared impossible. In a particular instance, an elderly primipara, aged thirty-nine years, the wife of a physician, I thus dilated an exceedingly rigid and small parturient outlet as a preliminary to a low forceps operation. The husband who watched the procedure was amazed at the result, as no laceration of any moment subsequently occurred.

I confess that there are certain kinds of pelvic-floor rigidity that will resist this and every method of prophylaxis, and tearing instead of stretching will occur. One patient in private practice I have delivered three times, yet in spite of every precaution exclusive of episiotomy, perineal laceration to the so-called second degree has taken place in each confinement. Since I have more generally used this method of perineal dilatation I have seldom been compelled to resort to episiotomy, and that only in cases of emergency where time was wanting to employ the stretching method.

2. Episiotomy. I have nothing new to offer upon this subject. My belief is that the operation is one for the novice in obstetrics. The greater the clinical experience the more infrequently will the operation be required.

3. Head Delivery. In respect to head delivery, I have again nothing that is new to offer. I endeavor, first, to have the delivery of the head so slow that stretching and not tearing of the parts results. Because the pelvic-floor muscles

are relaxed in the interval between the uterine contractions, head delivery is more safely accomplished at this moment, hence I secure delivery of the head during the interval.

4. Cleidotomy. Cleidotomy or division of both clavicles in dead fetuses as a preliminary to delivery of the shoulders has for its object the diminution of the bisacromial diameter. This simple operation, rarely mentioned in obstetric text-books, has never, I am sure, taken its proper place in obstetric surgery as a valuable means of lessening maternal morbidity and mortality. How often have we witnessed a difficult extraction of the shoulders in a generally contracted pelvis or outlet after the perforation and extraction of the head. I have seen twenty minutes consumed in the delivery of the shoulders. I have seen the head dragged from the body, from the excessive traction. I have had cases brought into my Bellevue Hospital service with the head delivered and the shoulders still within the pelvis. These last are usually midwife cases.

As a matter of routine in these cases, I divide the clavicles, and it is amazing how the diminution of the bisacromial diameter thus produced renders the subsequent extraction of the fetal shoulders a comparatively easy task, and quickly and completely changes the clinical picture for the better. In my experience the operation readily reduces the bisacromial diameter from five inches (12.7 cm.) to three inches (7.5 cm.). For the operation I always use a pair of heavy straight or curved obstetric scissors of the Dubois type, two fingers of one hand being used to guide the blunt points to the middle of each clavicle. It is usually necessary to strongly extend or flex laterally the fetal head so as to give room for the use of the scissors. I firmly believe, from years of careful clinical observation, that the posterior shoulder is responsible for many instances of deep pelvic-floor laceration. Further, that moderate ruptures caused by the passage of the head are often increased and rendered serious by the subsequent passage of the posterior shoulder.

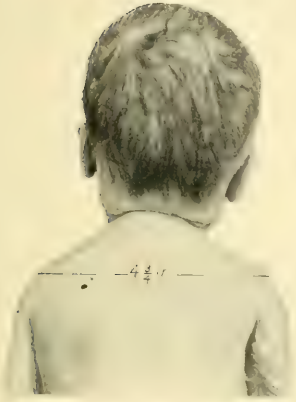
5. Shoulder Delivery. Little importance is usually attached to the method of shoulder delivery, and it would appear that various methods are in vogue. Among five of the more recent text-books upon obstetrics I find in one but eight lines devoted to the management of shoulder delivery, and in another ten. One of these five authors advises the birth of the posterior shoulder first, the anterior being engaged behind the symphysis; the second, the posterior shoulder first, after the anterior has been brought under the symphysis; a third gives no specific directions whatever, and the fourth and fifth consider it immaterial which shoulder is first allowed to emerge from the outlet.

Observation will, I believe, convince anyone that considerable destruction of the perineum is often caused by the posterior shoulder. The difference in the conformation of the head and shoulders readily explains the fact. The vertex is round and smooth, with a tapering extremity, and the alternate descent and retraction of the head in labor causes a gradual and uniform distention of the parturient outlet. The bisacromial diameter measures much more than the dorsosternal; again, the shoulders are irregular in shape, with advancing surface having projections which stand out abruptly from the comparatively small and thin neck; further, the shoulders, if left to spontaneous delivery, are commonly delivered by a single uterine contraction.

Regarding the normal mechanism of shoulder delivery, it is generally true that when the expulsion is purely spontaneous the posterior shoulder is born first. Auvard found that in 29 cases the posterior shoulder came first in 16, and the anterior in 9 cases. Leonet asserts that the anterior shoulder first disengages in 90 out of 100 cases, if the fetal head is not supported; that the posterior first emerges in 90 out of 100 cases if the head be supported.

I found that when the head was slightly supported the posterior shoulder was born three times as often as the anterior in 69 primiparæ, and two-and-a-half times as often in

Fig. 1.

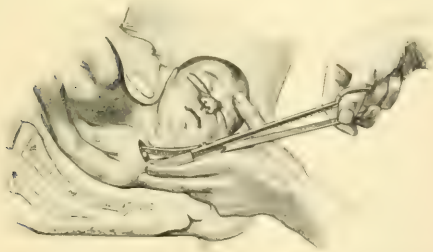


Fetal cadaver before cleidotomy
(From Edgar's "Obstetrics.")

Fig. 2.

Fetal cadaver after cleidotomy
(From Edgar's "Obstetrics.")

Fig. 3.



The operation of cleidotomy. Performed with long, curved scissors.
(From Edgar's "Obstetrics.")

Shoulder delivery, first step. Directing the anterior shoulder well up behind the symphysis, thus securing the engagement of the cervico-acromial diameter.

Fig. 5.

Shoulder delivery, second step. Delivery of the posterior shoulder.

Fig. 6.

Shoulder delivery, third step. Delivery of the anterior shoulder by

68 multiparæ. I further found from my observations in 15 cases of spontaneous delivery in primiparæ and 28 in multiparæ in both the dorsal and lateral postures that posture of the woman does not appear to affect the mechanism of shoulder delivery.

I have been most successful with the following method of shoulder delivery, and either the lateral or dorsal posture can be used at will. 1. The delivery of the shoulders is delayed if possible until nearly complete rotation of the bisacromial diameter has taken place (Fig 4). 2. The fetal head is taken in the hand and gently raised or pushed, so as to bring the anterior shoulder well up behind the symphysis, thus giving the cervicoacromial diameter of the fetus at the outlet instead of the bisacromial (Fig. 5). 3. The posterior shoulder is now allowed to pass out spontaneously; whenever possible manual extraction should be avoided, as this increases the risk of perineal rupture. 4. During the detention of the anterior shoulder behind the symphysis the fetal hand of the opposite arm lying across the fetal chest will usually soon appear in the vulva (Fig. 6). I have found that delivery may be safely assisted by slowly flexing the forearm and arm out through the vulva, and thus delivering the posterior shoulder by slight traction on the posterior arm. 5. Should the foregoing be impracticable, and delay in the expulsion of the posterior shoulder occur, I have found gentle traction upon the head, the fingers encircling the neck, to be preferable to traction with a finger in the axilla. 6. Should there be delay in the delivery of the anterior shoulder, after expulsion of the posterior, it is best remedied by making traction directly downward, with the hands placed on the sides of the head, taking care not to make too great pressure on the perineum. As a last resort, traction may be made by a finger in the axilla.

THE IMMEDIATE REPAIR OF LACERATIONS OF THE PERINEUM, WITH SPECIAL REFERENCE TO PLACING THE SUTURES IN POSITION BEFORE THE LACERATION TAKES PLACE.

By A. Lapthorn Smith, M.D.,
Montreal, Canada.

The importance of closing up small tears of the vagina and perineum has not so far been generally recognized by the profession. Year by year we have been getting to understand that deaths during the puerperium are due to a great many causes, and we see that just in proportion as we succeed in eliminating these causes the death rate in childbirth is growing less. Infection still remains the greatest cause, and we have still much to do before the whole rank and file of the profession of midwifery realize the importance of making the fewest possible vaginal examinations and of making even those few as nearly aseptic as possible. But since it is practically impossible to reach perfection in this direction, we must turn our attention to lessening the avenues by which germs may enter the system by immediately closing all tears so as to leave no raw surface in direct connection with the lymphatics. At one time it was thought that puerperal infection took place only through the cavity of the uterus and the tubes, or through the placental site; but since we have been opening the abdomen for the relief of puerperal septicemia we know that the infection frequently reaches the blood through the lymphatics, receiving lymph from the perineum, vagina, and cervix. In nearly

every case I have seen, the chain of lymphatics running up the side of the uterus was filled with pus. More than once I have seen the temperature come down promptly after washing out the uterus and vagina and packing the latter with sterile gauze so as to stop absorption.

The question of the immediate closing of tears of the cervix has been assigned to other members taking part in this discussion. I heartily indorse all that has been said in favor of it, and I know of at least one maternity hospital where the procedure has been regularly adopted and with marked success. As regards tears of the vagina, they should be sewed up with a running, fine chromicized catgut suture while the patient is still under the anesthetic. Owing to the ease with which the cervix can be drawn down or forward or backward with a four-pronged forceps, and owing to the great distensibility of the vulva, especially if it is torn, as it generally is when the vagina has been lacerated, there is no difficulty in seeing the tears in the vagina and closing them before closing the perineum. The field of operation can be kept clean by having copious constant irrigation going on, or the uterus can be packed with gauze temporarily to keep the usual trickling of blood from flowing over the vagina.

For the same reasons as the foregoing, namely, to prevent septic absorption, it is important to close even small tears of the perineum. During the last fifteen years I have made a regular practice of putting in a stitch or two in every case in which even half an inch of the fourchet has been torn. The result has been that my patients have been almost entirely free from the slight rise of temperature on the second or third day, which it has been customary to attribute to the milk, but which I suspect is due rather to a little septic absorption through these slight lacerations. I am certain that patients who have had these small lacerations of the perineum repaired have made better convalescences than those on whom this was not done. In the case of very considerable tears of the perineum, especially of those which extend through the sphincter

into the bowel, the question of loss of function of the muscles of the perineum and of the pelvic fascia is still more important. Emmet has described the results of this accident so well that it is unnecessary to draw attention to it. Every member of this Society knows that the separation of the levator ani and transversus perinei muscles disables a woman very considerably. Nature, it is true, tries to heal these tears, but she is only able to do it by granulations, which are converted into scar tissue, which in a place so full of nerves as this, must cause reflex irritation when the inevitable contraction takes place. There are many other reasons which are well known to the profession why we should close all tears of the perineum. I once operated on a physician's wife, who was a beautiful woman and a great social favorite, who was lacerated during her first confinement and was practically a prisoner in her room for the next twenty years, owing to loss of control of the bowels. This in turn led to the wrecking of their domestic happiness, for the reflex irritation ruined her nervous system.

I admit that the immediate repair of the cervix, vagina, and perineum is difficult in a poor house with poor light and poor assistants, and it would be better to send for assistance in the form of an expert in plastic work, who, with the help of a nurse and the family doctor, could quickly sew up all tears. But in cases in which such a man is not available the family doctor himself, if provided with catgut and silkworm-gut ready sterilized and a few Péan forceps, some small curved needles, and a good needle-holder, and above all with a large curved perineum needle on a handle, can obtain very good results. The greatest difficulty consists in securing the divided ends of the levator ani muscles and pelvic fascia, which retract at once when torn; for it is of little use to sew up the perineum without taking in the muscles. This difficulty, however, can be overcome by a method which I have devised.

Just before the child's head comes down upon the peri-

neum, the patient is anesthetized and brought across the bed with the feet held by a twisted sheet or leg-holder. The perineum is sterilized with soap and brush and mercuric bichlorid, and then with the large curved needle firmly held in the right hand, and with the thumb of the left hand in the anus and the left forefinger in the vagina, the needle is entered at the base of the lesser lip on the patient's left, and passed rapidly under the vagina and about two and one-half inches above the fourchet, coming out at the corresponding point on the woman's right side. A silkworm-gut is threaded into it with the right hand, and the needle is withdrawn, followed by the silkworm-gut, the two ends of which are caught with a Péan forceps. A second one is passed in the same way an inch lower down, but taking in the muscles of the perineum. We can generally tell beforehand, by the rigidity of the perineum, whether the tear is going to be a bad one or not; in the former case we can put in a third stitch which would take in the sphincter ani on each side of the middle line. Delivery can now go on naturally or artificially, but as soon as the placenta has been delivered the perineum is inspected under a good light and a stream of water, all clots being rubbed off with the finger; the stitches are tied from above downward, when we will find that there is absolutely accurate coaptation of the separated parts.

Speaking of the light in the confinement-room, especially of the poor, we should always take steps before delivery to provide a good light, for two reasons: (1) that we may see how dirty the place is, and (2) to see what we are doing. As a rule, a darkened room means a dirty and a badly ventilated room. In the daytime arrange the patient so that the perineum will be facing a bright window, and if the confinement is likely to take place at night provide beforehand for a good light easily available for examining the perineum. When we hear physicians say that they have never seen a laceration of the perineum, they may be telling the truth, because they attended all their patients in a dark room.

The presence of the silkworm-gut stitches placed as stated, before the head comes through the perineum and hanging loosely attached by their ends to a Péan, does not interfere with the termination of the labor in any way; not even if forceps are required. If by keeping the pains under control and the head well toward the symphysis there has, happily, been no laceration, no harm is done by their having been introduced; you simply take off the Péan and draw them out. While if the perineum has been lacerated more or less it is a great advantage to save time and trouble by having them already in, but still more so by having them exactly in the right place to bring the lacerated surfaces together, just as they were before the delivery. I have often heard Emmet refer to the failure to restore the muscles; and in many cases in which repair was immediately done I have had to do a secondary operation some years later for the restoration of the muscles.

In conclusion, I would strongly urge every accoucheur to have in his bag a sealed tube with a sterilized needle and catgut in alcohol and another with six threads of silkworm-gut in alcohol, as well as a needle-holder, a bullet forceps, and a perineum needle on a handle. As good light is a great desideratum, a laryngoscopic mirror or headlight would greatly facilitate rapid work.

The placing of the perineal sutures before the tear occurs is an instance in which "an ounce of prevention is worth a pound of cure."

IMMEDIATE REPAIR OF INJURIES OF THE PELVIC FLOOR.

By H. C. Coe, M.D.,
New York City.

In confining myself to a single class of recent lacerations I desire to emphasize my belief that by careful attention to these lesions immediately after labor the patient can be spared the necessity of subsequent operations.

I assume that it is the practice of all my hearers after a severe instrumental or manual delivery to make a thorough examination of the soft parts for deep, as well as for superficial lesions, with the view to the immediate, and especially the future, welfare of the patient. While our present aseptic technic robs these injuries of their importance as channels of infection, it is contrary to the instincts of a surgeon to leave extensive raw surfaces to heal by granulation. The question is not "*Do* we repair such lesions?" but "*How* do we repair them?" It must be confessed that the temptation after a long, tedious labor, terminated instrumentally, which leaves the patient exhausted and perhaps in considerable shock, when the light is often bad (especially at night, or early in the morning) and the assistance not the most skilled, is to patch up the bruised tissues hastily and to "trust to nature"—whatever that may mean. Just as after a bad laparotomy, where we may have slurred over important details, thinking that the patient may not live anyhow, she does live to be a standing reproach to us.

If we adopt the ordinary rule of the modern accoucheur —to leave a woman in as good condition as we found her—

we cannot afford to do superficial work. The public demands of us quite as much as the profession in these days. I need not go into the subject of injuries to the pelvic floor, as that is elementary. We understand perfectly well why it is that a woman who, after a medium forceps sustained apparently a superficial tear, repaired at the time, presents herself a month or two later with a rectocele, prolapse, and all the evidences of loss of support of the pelvic organs. The fact is (as we teach our students) that she had *not* a simple tear of the perineum, that insignificant structure between the fourchet and the anus, but an actual laceration of the fascia and levator ani muscles *outside* of the vaginal tube. As has been clearly demonstrated by my assistant, Dr. Studdiford, by means of dissections and frozen sections, the essential point in the deeper lesion of the pelvic floor is really separation of the involuntary fibers of the levatores ani from the vagina, with or without anterior and posterior tears (of the triangular ligament and sphincter ani). Dr. Emmet long ago pointed out the clinical result of the lesion, and demonstrated the fact that the ordinary operations of colpoperineorrhaphy failed to repair this. From our experience in a considerable number of cases at Bellevue we have found that the circular buried suture suggested by Studdiford, which penetrates the entire thickness of the vagina at the sulci, does permanently reattach the torn fascia and restore the parts to their normal condition. Hence I affirm that this suture, or a modification of it (of chromic gut or kangaroo tendon), should be used in the immediate operation if the surgeon expects to avoid the rectocele which is itself an indication of imperfect technic, no matter how satisfactory the immediate result may appear to be. It can be easily and quickly inserted, entirely controls the troublesome oozing which is often present, and brings the separated levator ani muscles into close contact with the relaxed vagina. The sooner we recognize this as the common and inevitable consequence

of difficult delivery, the sooner we shall learn to look for it and repair it *at the time*, and not wait until its results have become marked. But the best test is the ultimate condition of the patient, as indicated in the following illustrative case:

Six weeks ago I had occasion to anticipate by two weeks the delivery of an old primipara, with a normal pelvis, but rigid soft parts, whose condition had caused me anxiety from the beginning of pregnancy. The fetus was large, lay in an occipitoposterior position, and the head could not be engaged. Without going into details, suffice it to say that the membranes ruptured early, that it was necessary to complete the dilatation manually, to apply high forceps (on account of fear of rupture of the uterus), and that delivery of a living child was effected only after an hour of hard work, during which, in spite of the greatest care, the cervix was badly lacerated and the pelvic floor also, some of the fibers of the sphincter being involved. The uterus contracted well, but hemorrhage was so profuse that I at once sutured the cervical tear. Having skilled assistance I spent fifteen to twenty minutes repairing the laceration of the pelvic floor, using both buried and superficial sutures, the parts being thoroughly exposed by a gloved finger introduced into the rectum. My aim was not only to strengthen the sphincter, but to pass my sutures clear through the vagina, in order to pick up the torn levator ani fibers, or fascia, especially at the points where they are attached to the vagina (at the lateral sulci) and also where they blend with the sphincter ani.

The patient rallied well after her prolonged ether anesthesia (nearly two hours), and had an afebrile convalescence, being able to nurse her baby. The ultimate result, with which we are immediately concerned, has been most satisfactory. Anatomically and symptomatically, she is apparently in just as good condition as she was before delivery. (Six months later the result is still as good.)

That it pays to devote such careful attention to recent lacerations has been proved so many times in my experience, that a patient must be in a serious condition, indeed, when I would be content hastily to close a lacerated pelvic floor with a superficial catgut suture, as I have done (and seen others do) so often in the past. In laceration through the sphincter I believe that a successful result from an immediate operation should be the rule and not the exception. Only twice has the condition of the patient been such that I have thought it wiser to wait for a secondary operation.

It is true that the bruised condition of the tissues often renders immediate repair difficult, but with a little patience the parts can be brought in exact apposition. Provided that the ends of the muscle have been united with a non-absorbable suture, that the after-treatment is intelligent (especially as regards securing a loose movement of the bowels on the third or fourth day), and above all, that the asepsis is perfect, I see no reason to look for anything but perfect success. How much future trouble and annoyance the patient is spared is self-evident.

The most brilliant obstetric operation counts for little if the patient is left with incontinence or a rectovaginal fistula. And it is just in these cases of complete laceration that I insist upon the necessity of repair of the deep pelvic floor lesion, as well as of the perineum. One's attention is so apt to be centered on the torn sphincter that one overlooks the mischief that is done prior to the delivery of the head.

In a word, the modern accoucheur must be a thoroughly trained gynecic surgeon, who not only recognizes the true lesion at the time of its occurrence, but looks into the future and sees the patient's condition months after the injury. Our esteemed Fellow, Dr. Hirst, was right when he said that "the specialist in obstetrics must be an expert in the surgical treatment of diseases of women."

DISCUSSION OF THE SYMPOSIUM ON INJURIES OF THE PERINEUM.

Dr. Edwin B. Cragin.—It gives me great pleasure to indorse most of the remarks of the first paper. There are just a few points I would like to lay a little stress on. In the first place, in regard to the stretching of the vulva, recommended by Dr. Edgar, I will say that I have found that of value, especially before the application of forceps in a narrow vulval outlet; but a little stress should be laid on the danger that sometimes follows or accompanies it; that is, if the stretching is extended a little beyond what is right and little lesions of the vulva occur either at the hymen or at the fourchet, when the shoulders come down they are apt to increase the small lesions into large ones, so that, although I recognize the value of the procedure, I think we should always recognize the danger of it, unless the case is in the hands of a very careful man.

In regard to episiotomy, I feel with Dr. Edgar that the indications for it are very seldom, if ever, present. Personally, at the Sloane, I never do it, nor do I allow any of my assistants to do it.

With reference to cleidotomy, we all recognize the value of that procedure in narrow pelves where the shoulders have been delayed in their descent.

In regard to the birth of the posterior shoulder, I do not believe that enough stress is laid upon that as a factor in laceration of the perineum by the majority of obstetricians. I have no doubt but that the shoulder is the factor in a great many of the lacerations of the perineum that are extensive. A small laceration started by the fetal head is increased in the majority of cases by the shoulder. Therefore, I believe that all the stress Dr. Edgar has laid on the treatment of the delivery of the shoulder is of value. It may be of interest to mention how the same thing may be accomplished in different ways. For instance, it is our custom at the Sloane to deliver the anterior shoulder first, and we do this for the reason that we believe if a small laceration of the perineum is started by the birth of the head we can save further extension of the laceration in the birth of the remainder of the child by keeping the pressure and weight

off from the perineum as much as possible. In the method of delivery of the posterior shoulder first, when the anterior shoulder is delivered the head and body have to fall back upon the perineum; but by the delivery of the anterior shoulder first, as soon as that is born we raise the shoulder and head and the body as it comes along is lifted from the perineum. It is simply another way of accomplishing the same thing, but in our experience it is very satisfactory, and therefore we continue it.

In regard to the paper of Dr. Lapthorn Smith, it is the general rule not to cross a bridge before you come to it. It seems to me that it is a good rule to follow in obstetrics. In the method he advocates he is not only crossing a bridge before he comes to it, but he is building a bridge which may subsequently present difficulties in crossing. It may not be needed, and the extra needle points for the introduction of these sutures, unless his sutures and points of introduction are thoroughly sterile, may increase the danger of infection, the very thing most of us are anxious to avoid, if possible, in obstetrics.

Dr. E. W. Cushing.—In reading a paper on this subject a short time ago I stated that in my practice I usually closed a wound or laceration in the perineum before the placenta was expelled. It is merely a matter of ten or fifteen minutes while the woman is deeply under anesthesia; there is no blood or discharge; it is very convenient to utilize the time and avoid hemorrhage by closing any rent there may exist in the perineum then. The question has arisen as to what would happen in those cases in which the placenta would not come out and must be removed after the rent was closed. I have found no difficulty whatever in that respect. The opening is as big as it ought to be, even after the laceration or lacerations are closed. If we should find it necessary—and occasionally we will run across such cases—to introduce the hand to remove the placenta, it would not be a difficult matter to cut a couple of stitches or leave two untied and held in a Péan forceps until such time as we are assured the placenta can be expressed.

I shall be glad to know from the gentlemen who read these papers the best time to close a lacerated perineum.

Dr. Bache McE. Emmet.—In view of the consideration of lacerations of the perineum, we may take into account those

that are practically of the same order, but not of necessity lacerations, namely, overdistention, dilatation of the parts, and injuries, the results of which are similar to those from destruction of tissue. Many of the cases we see in suffering women are lacerations due largely to overstretching; there is also subinvolution, and in many cases the patients have not been properly cared for. There may be slight adhesions. In some cases we see the cessation of lactation or interference with it from a slight septicemia in nursing their babies. The uterus does not undergo the proper atrophy, nor the tissues outside, the vagina markedly so, and if they are allowed to rest for the ordinary time we see these parts prolapsing, and results are brought about such as are observed when there have been lacerations of the deeper tissues. Rectocele usually takes place, and the uterus coming down with a certain amount of sagging, retroversion occurs, and we have to go through the whole process of events to restore the parts to their natural conditions and bring about the results we desire.

Dr. Edward P. Davis.—As regards the paper of Dr. Edgar, it has been our custom to consider expulsion of the shoulder as a very important portion of the birth of the child. The anesthesia brought into play to minimize laceration during the expulsion of the head should be continued until the shoulders have been born, and in that simple precaution we have an efficient remedy against extensive laceration by the shoulder. It is our custom to allow the fetal head to be born with due care of the shoulder nearest the external orifice. Sometimes the lower shoulder is the most available; sometimes the upper shoulder can be born first. We conduct the delivery of the shoulders with reference to the position of the child's trunk when the head has been expelled, choosing either shoulder as the case indicates, being careful to carry out some of the manipulations described, raising the head and controlling the expulsion of the fetal body.

To prevent laceration of the posterior pelvic floor, we must remember the danger of laceration of the anterior segment of the pelvic floor, and considerable hemorrhage and laceration into the veins about the clitoris and other adjacent structures may follow a too vigorous endeavor to protect the posterior segment. For that reason we let nature declare herself,

so far as she will, as regards the method of delivery of the shoulders.

As regards the paper of Dr. Coe, it is our experience that a complete tear through the sphincter muscle almost never fails to heal when the laceration is absolutely closed. We have seen no failures in our hospital cases. I recall no private case of failure of the sphincter muscle to unite functionally after appropriate closure of a very recent laceration. It is our habit to use rubber gloves or rubber finger, raising the bottom of the pelvic floor by the introduction of the finger into the rectum; protecting the hand from infection, we can bring the lacerations in the sulci into view; closing the upper borders of the sulci, and giving attention to the sphincter we have secured important points in the pelvic area. The other parts of the laceration are closed without special difficulty. Certain it is, those of experience should not despair of securing good closure of the torn sphincter if they operate cleanly and promptly and recognize the muscle and bring it together.

Dr. Ely Van de Warker.—It has been a privilege for me to be here to-day and to have listened to Dr. Edgar's paper, because I have had a strong feeling on the subject of laceration of the perineum and have taken issue with text-books so long in the past that it was due to the fetal head that I hoped this matter would come up and be definitely settled that it is the shoulder which is the part at fault in the production of perineal tears. I remember some years ago, when the first edition of Dr. Davis' book appeared, and which I revised, I took that ground firmly; but I had also written on the subject before, and all that has been written in this regard seems to have fallen on barren soil, because I think the text-books have been continually perpetrating the error and placing stress where it does not belong, on the head instead of the shoulders of the child.

I would like to go back seventy-five or one hundred years and call the attention of the Fellows to a little instrument that my old preceptor used successfully, called the vectis. It is an instrument of precision almost in this sense, that the individual factor of the operator comes in in the use of the vectis. With the use of the forceps, so carefully formulated are the rules that the individual factor of the operator is practically eliminated. It

is merely a question of how you are going to pull and in what direction; whereas the vectis gives you the chance to keep back a part, retard its onward movement while encouraging the onward movement of another part. I have used the vectis very little myself, but I have known him to do such wonderful things with it that I would like to call the attention of the Fellows to the instrument.

Preventive medicine, I suppose, is one of the chief agencies of the age. If we can prevent anything it is far better than to cure it after it has occurred, and if one is satisfied that Dr. Smith's preventive sutures will safeguard the perineum against injury, we must look upon him as a benefactor to his race and he ought to have his picture in the Hall of Fame; but it strikes me that this method would do just the opposite for him. It appears to prevent the natural resiliency of the parts, you cannot put these sutures through from side to side, as described by Dr. Smith, and preserve the resiliency of the parts, because where the head comes first and the shoulders second you are going to have a mechanical impact, and the parts are just as elastic as the sutures that are used to fasten them. The normal elasticity of the perineum should not be interfered with. The perineum has the capacity to stretch, to elongate, instead of tear. It seems to be the natural endowment of the perineum if it is not carried beyond the breaking point. Of course, there are lesions produced which are liable to be foci of infection, as Dr. Smith has pointed out, but we might eliminate these. I do not think I shall practice Dr. Smith's proposed method. I say proposed, because I do not understand that he has actually put it into practice.

Dr. Smith.—Yes I have, many times.

Dr. A. F. A. King.—I want to present just a single idea. There is a difference of opinion as to whether the anterior or posterior shoulder should be born first. I do not think there should be any doubt about the posterior shoulder being born first. With this difference of opinion there is, so to speak, a supreme court, the court of nature, to which we may submit this question. Let us suppose that here is a woman being delivered by herself. If there is no great distention of the perineum after the head is born, and if the shoulders are of

moderate size, they will soon be delivered without laceration of the perineum. Let us suppose a large pair of shoulders, so that it will take some minutes before the shoulders are delivered, will the savage woman lie still? No. She will rise and sit up; she will pull the head toward the pubes; she won't push it away. She will push the anterior shoulder back and let the posterior shoulder come first.

Take a case of breech presentation, it is the same thing. If there is any delay in the after-coming head the woman with a spirit of affection and investigation will lift the child's body up toward the abdomen, just as the obstetrician has learned to do by a scientific study of the subject. Exactly in the same way we modern obstetricians have learned to make pressure on the fundus to express the placenta.

This pressure is necessary in the civilized woman, who is the only animal in creation that turns over her newborn child to another individual of the same species—the nurse.

In a state of nature the parturient woman would sit up, flex forward her body to take the child, and put it to her breast. Suction of the nipple would thus produce uterine contraction, aided by the child's feet pummelling the fundus, and by increased abdominal pressure upon the uterus caused by the woman flexing her body forward, the diaphragm and pelvis being thus made to approach each other. In modern practice the hand of the obstetrician secures the same result; and it is right. The supreme court of nature confirms it, in the same manner as it confirms the method of delivering the posterior shoulder first.

Dr. Hiram N. Vineberg.—I merely rise to say that I have been following the practice mentioned by Dr. Cushing, of putting in sutures after the birth of the child and before the placenta is expelled. That I do in cases of moderate tear of the perineum where the woman is not exhausted. But in real bad cases, such as Dr. Coe has described, I think the best results can be obtained by doing an operation five or six or twelve hours after delivery (unless, of course, there is profuse hemorrhage). The operation then can be done with proper assistants; the operator is in better shape himself and the patient has had time to rally from the shock of a difficult and protracted labor.

It seems to me that not enough stress is laid upon the fact that the tears are not, as a rule, in the median line, but in either sulcus or vagina, and in the bad tears that extend down to the cellular tissue it requires thorough exposure with lateral retractors to apply the sutures properly.

Dr. Davis brought out a good point in stating that the lacerations are not limited to the posterior aspect of the pelvic floor, as in a great many cases the anterior wall of the vagina and vulva are severely lacerated, and I have seen profuse hemorrhage occur from those parts.

Dr. Edgar.—The danger of laceration from digital stretching of the vulva is practically the same as the danger of laceration from digital dilatation of the cervix, and when we use ordinary precaution stretching and not laceration is produced.

Cleidotomy was forced upon me. In an ambulance service I have had patients turned over to me by midwives who have abandoned them, or they are referred to us by physicians to be delivered. There are many of them in which the fetus is dead when they come in. I have seen patients brought into this service with the fetal head hanging out and large shoulders undelivered, and I considered it less mutilating to the mother to divide the fetal clavicles, and this I have done in several cases.

As regards the remarks of Dr. Cragin about the delivery of the posterior shoulder, it is a matter of personal experience. I have tried in a series of cases delivering the anterior shoulder first, and in another series I have tried delivering the posterior shoulder first, and I have gotten better results by the latter method than any other.

Dr. King spoke of the posterior shoulder appearing first. I have no doubt about that. I admit the danger of laceration about the anterior commissure, but if the anterior shoulder is not drawn up too much, if the uterine action is not too strong, the danger of laceration behind the clitoris and at the anterior commissure is practically minimal.

The statement made by Dr. Smith that laceration of the perineum can always be prevented, I personally would not like to see go out unchallenged. I know of no way by which a laceration of the perineum can always be prevented. To say that a perineum will or will not rupture in a given case is an im-

possibility. Such a statement is not borne out by the clinical facts. We see, for instance, a primipara with a vulval outlet so narrow that it appears to be absolutely impossible for a five months' fetus to be delivered without tearing the pelvic floor all to pieces, yet with care and dilatation, the proper use of chloroform, time, allowing the head to come down only after the parturient canal is dilated, we can deliver the child without any laceration of the pelvic floor, whereas in the first instance it seemed impossible. There are cases in which we can protect the perineum from laceration, while in others a laceration will occur in spite of every precaution. I recall one case, a young woman who was delivered twice. She had a laceration of the sphincter of the second degree in the first confinement, and although every precaution was taken for the prevention of a laceration in her second confinement, yet one occurred.

Dr. Smith. I am sure, if Dr. Van de Warker grasped my point, he would be one of the strongest advocates of the method which I have been using. I do not tie these stitches. I introduce them, and they lie harmless in the tissues. I let them remain there until I want them. You need not have any fear that the presence of these stitches will cause infection, for I take as elaborate precautions for this work as I do for a laparotomy. I sterilize my hands and the skin of the perineum as well as the needle and ligatures, and what harm can come from these stitches if they are allowed to lie there until they are wanted? If they are not wanted, they can be taken out in a moment. If wanted, they are there ready to be used the very moment the placenta is delivered, and in two minutes the important duty is over, and he can get away feeling secure that raw surfaces have been closed against infection and muscles have been accurately brought together.

Dr. Edgar does not believe that one can tell beforehand whether there is going to be a laceration of the perineum or not, but if he had seen some practitioners apply forceps long before this time with two feet on the pelvis, and pull, he would have a pretty good idea that there would be a laceration of the perineum. Furthermore, he says no man can tell whether a given perineum is going to rupture or not during the delivery

of the child, because sometimes a perineum gets lacerated when we think such a thing should not occur. We have all at some time or another made the mistake of putting on forceps and pulling the head through a rigid perineum before it had had time to relax, and in these cases we can prepare for what is almost sure to happen.

Owing to excessive education the perception of pain is becoming more and more acute, and the kind-hearted accoucheur cannot bear to see them suffering agony for twenty-four hours in the first confinement, as he should, and he therefore applies the forceps much sooner than his judgment tells him he should. But we have a remedy for quieting the nervous system. We have an opiate. The most successful man in this line of work in Montreal, who is a favorite with all the women, gives them a grain or two of opium at the first visit, which takes the keen edge off of the pain. This allows the woman to sleep all night, just as most uneducated women do. That is a great advantage. I think if this were done more generally we would be compelled to use the forceps less often, and we would have less lacerations of the cervix than we do.

DR. COE.—Preliminary dilatation of the pelvic floor has been referred to, and, it seems to me, if properly done there is little danger of laceration following it. I cannot recall any but slight tears of the mucous membranes, which have followed this procedure. I believe the cases Dr. Emmet referred to, of subinvolution or relaxation of the perineum, are really deep lacerations.

Dr. Cushing referred to suturing before the removal of the placenta. Dr. Marx read a paper on this subject many years ago, at which time I took exception to his method, although his idea was simply to put the sutures in position before expressing the placenta, Labor, too, is surrounded by more or less uncertainty. In reply to a question by Dr. Goffe, I would say that the circular suture referred to is described at length by Dr. Studdiford in a recent number of the *American Journal of Obstetrics*. With this suture he includes the superficial fibers of the sphincter, penetrates the entire thickness of the vagina beneath the left sulcus, emerges, picks up the involuntary fibers of the levator ani muscles, which (as has been

demonstrated by him on frozen sections) are lacerated at the time, passes it around, still buried, goes under the right sulcus, again picks up the muscle, and comes out in the median line, picking up the superficial fibers and making a purse-string. This brings together the sulci and disposes entirely of the relaxed condition of the vagina, elevates the depressed sphincter and restores it to its natural relations. We have tried this in a series of cases at Bellevue Hospital, with entirely satisfactory results.

ON UNIFORMITY IN PELVIC AND CRANIAL MEASUREMENTS.

By A. F. A. King, M.D.,
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After nearly two centuries of painstaking effort by leading anatomists, anthropologists, and obstetricians throughout the civilized world, it would seem that we ought by this time, if ever, to know definitely what are the actual dimensions of a typically normal pelvis and fetal head. But this desirable acquisition seems still beyond our reach. The author of almost every new text-book on obstetrics gives measurements different from those of his predecessors. Hardly any two are exactly alike. If any one of them be actually right then all the others, in so far as they differ from this right one, must be actually wrong.

This diversity of opinion is too well known by the Fellows of our Society to need any special accentuation or argument at this time; it is familiar to all. By way of illustration and for other purposes I have, however, put down in the table here presented the measurements of the superior strait of the pelvis as given by twenty-five leading obstetricians, from the time of Smellie up to the present day. About the same differences exist with regard to the other pelvic diameters and the diameters of the fetal head, which it is unnecessary to tabulate.

The methods by which the measurements given in the table have been ascertained have usually been to measure a good number of *promiscuous* pelves and deduce from these

a resulting average, or to measure in the same way a good number of *selected* normal pelves and obtain the average of these measurements. It is, however, quite evident that the size of any pelvis with which we meet in practice is no more likely to agree precisely with the average thus obtained than it is with any one of the specimens from which the average was deduced. Again, the resulting average obtained by any two investigators who use this method will scarcely ever come out exactly the same. Moreover, the measurements obtained from dried pelves, with shrunken ligaments and cartilages, are not the same as those of living pelves with which we usually have to deal in practice.

MEASUREMENTS OF THE SUPERIOR STRAIT.

Author.	Conjugate vera	Conjugate diagonales.	Diagonales.	Transversus.
Smellie	4½ inches	....	.....	5¼ inches
Denman	+4 "	.....	.....	+5 "
Burns	4 "	.....	5⅛ inches	5¼ "
Ashwell	4 "	.....	5⅛ "	5 "
Baudelocque	4 "	.....	4⅝ "	5 "
Gardien	4 "	.....	4½ "	5 "
Velpeau	4 "	.....	4½ "	5 "
Boivin	4 "	.....	4½ "	5 "
Chailly	4 "	.....	4½ "	5 "
Carus	4 "	.....	4½ "	5 "
Capuron	4 "	.....	4½ "	5 "
Dewees	+4 "	.....	5 "	+5 "
Hodge	4 "	.....	5 "	+5 "
Meigs	4 "	.....	5 "	4½ "
Bedford	4 "	4⅝ inches	4½ "	5 "
Lusk	4⅛ "	4⅞–5 "	5 "	5¼ "
Playfair	4.25 "	4.75 "	4.8 "	5.2 "
Leishmann	4⅛ "	5 "	5 "	5¼ "
Barnes	4.50 "	.....	5 "	5.30 "
Parvin	4.3–4.5 "	4.8–5.2 "	4.7–4.9 "	5.3 "
Hirst	4.33 "	5 "	5.02 "	5.32 "
Dorland	4–3307 "	5.0196 "	5.0196 "	5.3150 "
Webster	4⅜ "	4⅞–5⅛ "	5 " (12.6 c.m.)	5¼ "
Edgar	4¼ "	5¼ "	5 inches	5¼ "
Warren	4 "	4⅛–4⅜ "	4⅛–5 "	4 "

We thus reach the conclusion that the methods by which the authorized dimensions of the pelvis, as given in our text-books, have been ascertained, are intrinsically defective and

[1] The figures from Smellie to Dewees inclusive are taken from Meigs' Obstetrics, p. 62, edition of 1852. The others are taken from the authors themselves.

inexact. The same is true of the measurements of the fetal head; but what shall we do when no better methods seem to be available?

The answer to this inquiry may, I think, be reached by considering the *purpose* for which these measurements are made, and by a *better understanding of what this purpose really is.* Now, what is it? Why do we try to ascertain the normal dimensions of the pelvis and fetal head?

It is for the purpose and *only* for the purpose of obtaining an intelligent understanding of the physiology of parturition, in particular of that part of the process termed the mechanism of labor.

The authorized measurements of the pelvis and fetal head are used in order that the professor may teach and the student learn the mechanism of labor in normal cases. It is, therefore, to facilitate a study of anatomy and physiology with reference to labor. This only, nothing else.

At first sight this statement may seem to be unreasonable, or perhaps erroneous and untrue. Many, or possibly most of us, have been led to believe that an exact knowledge of the measurements of the normal head and pelvis are of extreme importance in the clinical management of abnormal cases; but is this really a fact? I think not. For example, in cases of pronounced pelvic deformity, such as the Naegele or Roberts pelvis, the kyphotic pelvis, the spondilolisthetic pelvis, the beaked pelvis of osteomalacia, or the common flattened pelvis of rachitis, are we the better able to cope with these difficult cases on account of our ideas as to what are the exact dimensions of a normal pelvis? I think not. Again—and to state my position more exactly—let us imagine five practitioners, one of whom believes, with Hodge, that the conjugata vera of the brim measures 4 inches; another believes with Lusk, that it measures $4\frac{1}{4}$ inches; another with Leishmann, $4\frac{1}{2}$; another with Hirst, 4.33, and another with Webster that it measures $4\frac{3}{4}$. Is any one of these practitioners more competent to deal with the

difficult cases mentioned *because* of his conception as to the exact length of the normal conjugate of the pelvic brim? Surely not. And the same may be said of "generally contracted" pelves, and also of lesser degrees of contraction in the common "flattened" ones. In practice it is the *relative* size of the *existing* head and *existing* pelvis in any given case with which we really have to deal. Our preconception as to the exact measurements in normal cases becomes altogether a secondary consideration of but little practical import. It is the abnormal case in the bed we have to consider, not the normal one recorded in our memory. Further argument in this line might be added, but I return to the statement that the only real use of our normal pelvic and cranial measurements is that we may learn, understand, and teach the mechanism of labor.

If this be true, why should the professor worry himself and bewilder his students with those hyperexact refinements of measurement with which our recent text-books are encumbered; and why cannot the profession agree with unanimity as to what these normal dimensions really are?

The best way out of the difficulty, it has seemed to me, would be the universal adoption of a *hypothetical* standard pelvis and head, to be accepted by all teachers and students as a basis for obtaining a knowledge of the mechanism of labor. In fact, such an *ideal* pelvis and head have been used all along and are still being used for the purpose mentioned, but the difficulty, which it is desirable to correct, is that the ideal of one authority differs from the ideal of another. I can discover no good reason why, by common consent, we should not all agree upon the same ideal measurements for both pelvis and fetal head, taking care that the *relative* dimensions of passenger and passage in the several diameters should be so well adjusted the one to the other as to promote and secure the normal mechanism which we now very well understand.

In the adoption of such hypothetic measurements for

the proposed ideal normal standard pelvis and head, I can see no reason whatever why we should ever use any fraction smaller than one-fourth of an inch, or in the metric system smaller than half a centimeter. Any further exactness would seem to be not only quite useless, but unnecessarily burdensome and bewildering to the student. And let it be distinctly emphasized that it is chiefly for the student body (numbering nearly 30,000 in the United States alone[1]) that our text-books are written. If we expect to teach them the normal mechanism of labor successfully we must present the subject in a manner as plain and easily understood as may be possible without any sacrifice of scientific truth. The more complex we make it the fewer will understand it and the less complete will that understanding be. And if the matter be made particularly complicated—as it must be by the exaggerated refinements of measurements to which I have referred—they will probably not understand it at all.

In Washington many graduates of the different medical colleges present themselves before the examining boards for admission to the United States Army, United States Navy, and the Marine Hospital Service. Every applicant brings with him his ideal of normal pelvic measurements as obtained from his professor of obstetrics. But the examiner on the board also has *his* ideal. Should the two not agree trouble ensues—trouble that could be readily prevented by the plan I have suggested.

It may be objected that the normal pelvis varies in different races. This is true, but the racial variation is not sufficient to constitute a real obstacle to the proposed plan, and is, I think, less than most of us imagine it to be. Thus, the measurement of the conjugata vera of the brim, as given by Dr. C. A. Lane,[2] and obtained by him in the Eden Hos-

[1] In the session of 1901–1902, the number of medical students enrolled in this country was 27,501; it is probably near 30,000 at present (See Science, September 12, 1902, p. 438.)

[2] Lancet, London, February 26, 1903.

pital in Calcutta for several different races, was as follows: Bengalis, 4.008; Eurasians,[1] 4.250; Europeans, 4.411; East Indians,[2] 3.937.

In an elaborate paper on "Apparent Peculiarities of Parturition in the Negro Race,"[3] by our distinguished Fellow and founder, Prof. Joseph Taber Johnson, of Washington, Joulin (1864) is quoted as endeavoring "to prove that the differences between the pelves of the various races pointed out by Vrolik do not exist," and "that the difference in the pelves of the Arabians and Mongolians between the transverse and oblique diameter of the inlet is ½ cm. in the Arabian and only a few millimeters in the Mongolian race. He does not consider this difference sufficient to be taken as race peculiarity." Dr. Johnson quotes a considerable number of writers, some of whom seem disposed to deny any material race variation altogether, while others admit it, as I think most of us will do.

But the *degree* of variation in different races is, I repeat, not sufficient to constitute an insurmountable obstacle to the plan I have proposed.

And that it is unnecessary to attempt a more precise measurement for any diameter than a fraction of one-fourth of an inch would appear evident from Dr. Garson's[4] investigations, which show that the variation between individuals of the same race was less than this, being, in fact, only 3 or 4 mm. He says the mean variations from the average in each of the races given in his table was as follows:

"Of the anteroposterior diameter" (referring always to the pelvic brim) "2.8 mm. in the Europeans, 4.4 mm. in the

[1] Eurasians are the fairer individuals of mixed races.

[2] East Indians the "markedly dark" ones of mixed races.

[3] American Journal of Obstetrics, New York, 1875, No. 1, vol. viii. pp. 88–123.

[4] Dr. J. G. Garson on Measurements of the Pelvis, etc., in the Transactions of the International Medical Congress, London, 1881, vol. i. p. 185.

Australians, and 3.7 mm. in the Andamanese; while that of the transverse diameter is 2.9 mm. in the Europeans, 3.8 mm. in the Australians, and 1.5 mm. in the Andamanese. Over the whole three races the average mean variation of the anteroposterior diameter is 3.6 mm., that of the transverse diameter is 2.8 mm. These figures show that both measurements are very constant in each race, but that the transverse varies least from the average."

That extreme precision in the dimensions of our proposed hypothetic pelvis and head is superfluous becomes further evident when we remember how they are liable to change during labor: the head diameters from moulding, and the pelvic ones from posture, notably from the Walcher position.

We have not yet learned to obtain more than approximate measurements of the fetal head before birth, but recent improved manipulations and instrumental devices for craniotomy, notably the cephalometer of Perret, promise better results for the future.

Even at present it is the *estimated* size of the head, compared with that of the pelvis through which it must pass, that mostly concerns us in a given case. In a pronounced abnormal case our ideal pelvis and head are really "lost to sight, to memory dear."

There are, of course, a great many difficulties to be encountered in obtaining an agreement as to what the dimensions of our proposed normal pelvis and head shall be. These difficulties arise in part from the unnecessary number of measurements upon which some authorities insist, and in great part from a lack of agreement as to the exact points between which some of the diameters are to run. None of these difficulties, however, are insurmountable.

We therefore reach the conclusions:

1. That at present the measurements of the normal pelvis and fetal head are indefinite and unsettled, and must continue so to be so long as they are determined by our present methods of mensuration.

2. The chief purpose in obtaining the normal dimensions of these structures being for teaching and learning the normal mechanism of labor, it is proposed to adopt an ideal or hypothetic head and pelvis upon the dimensions of which all authorities may agree.

3. In the adoption of such ideal structures it is unnecessary and undesirable to define any measurement with exact precision, no fraction smaller than one-fourth of an inch or than half a centimeter (in the metric system) being required.

4. Race variation forms no real obstacle to the proposed plan, and other apparent difficulties can be overcome.

Finally, should the proposition meet with your approval, it is suggested that this Society take the initiative in bringing the matter in proper form before some forthcoming international medical congress for general adoption.

DISCUSSION.

Dr. Philander A. Harris.—Teachers certainly differ from one another in their estimation of what constitutes the average size of the pelvis of normal conformation. One teacher, for example, tells us that the intercrest measurement of a normal pelvis should be about 2.5 cm. greater than the distance between the anterior superior iliac spines, and that departures from this difference indicates an asymmetric pelvis. Such teaching is absolutely incorrect, as I have proven, and as I believe any of you will find if you will prosecute studies in this relation, upon the lines which I have followed. It is true that the average size of the pelvis, which measures about 27.5 cm. between the iliac spines, is symmetrically formed, and it of course shows a difference of 2.5 cm. between these two diameters; but teachers rarely make any mention of the difference between the intercrest and interspinous measurement of pelves which happen to be very much larger, or very much smaller than the pelves which measure 27.5 cm. between iliac crests.

A very considerable percentage of all pelves are either larger or smaller than this so-called average sized pelvis, which the author of the paper would seek to establish. The student who is told that the difference of 2.5 cm. must exist between these two diameters, without regard to whether the pelvis be a large or a small one, is in my mind incorrectly taught. It appears to me that the greatest hindrance to the practical application of external pelvimetry has been that conclusions have been based upon a single size of the pelvis, rather than recognize the fact that pelves like hands and feet exist in a wide range of sizes.

Recognizing what I esteem to be the fallacies of teachers in this relation, and wishing to know what the external measurements of pelves of normal conformation in a variety of sizes would be, I prosecuted a work which was completed in 1894. Those studies were based upon the carefully made measurements of about five hundred pelves.[1] From it were excluded all pelves which I judged to be abnormal in conformation.

Assuming that the five hundred pelves thus measured and studied were of normal conformation, I divided them into fifteen distinct groups, according to their sizes. In the first group were placed such pelves as measured 24 cm. between the iliac crests at their widest possible diameters. In the next group were entered all pelves measuring 24.5 cm. between the iliac crests. In the next group, such as measured 25 cm. between the iliac crests. So that a class was formed for every size of pelvis, in half-centimeter increases, up to 31 cm. between the iliac crests. To show how results were obtained for one and another of these fifteen classes, we will take, for example, the class which measured 27.5 cm (which I suppose you would call an average sized pelvis) between the iliac crests. It was found that the average interspinous measurement for all of the pelves of this class was 24.9 cm. Thus showing a difference of 2.6 cm. between these two diameters. I found that the average external conjugate for the pelves of this class was 19.5 cm.

In this class of five hundred there was found one apparently normal pelvis, which measured 24 cm. between iliac crests, 22.3 cm. between the iliac spines, and which had an external

[1] Measured from life.

conjugate of 16.7 cm. There was also found in this class of five hundred women three pelves which measured 31 cm. between the iliac crests. The average interspinous diameter for these three cases was 27.1 cm. While the average external conjugate for the three cases of this class was 22.4 cm.

The average of all these classes above and below the standard size showed that the smaller the pelvis the less the difference between the intercrest and interspinous diameters, and the larger the pelvis the greater the distance between these diameters. The incorrectness of the allowance of 2.5 cm. as generally taught is unquestionably demonstrated by the fact that for a pelvis so small as 24 cm. between the iliac crests, that a deduction of but 1.7 cm. is required to show the correct interspinous measurement for that pelvis. While for a pelvis which measured 31 cm. between the iliac crests, that a deduction of 3.9 cm. was requisite to indicate the interspinous diameter.

Can anything more thoroughly prove the fallacies of our past teachings than an exhibit of my studies in this relation. Having measured five hundred or less normal pelves and classified them as above mentioned and grouped them into fifteen distinct classes according to their sizes, I averaged the intercrest, interspinous, and external conjugate measurements of each class by itself, and constructed from it a chart or table, in order that one might see at a glance the two companion measurements for a pelvis of any size ranging from 24 to 31 cm. between the iliac crests.

There are two classes of pelves which are liable to give trouble in parturition: the very small and the asymmetric pelves. By the use of external pelvimetry anyone can detect the small pelves, but I feel sure that no one can pronounce upon the moderately important deviations from normal conformation in any particular pelvis, whether it be large or small without knowing the relative measurements of the different diameters. These relative measurements for pelves in their varying sizes as determined by me from a study of about five hundred cases is doubtless of some value as a guide in the determination of symmetry or asymmetry in any particular instance. But I have felt that my conclusions would have been more accurate and therefore more valuable had they been based upon the examination of a very much larger collection of women.

As to the practical value of external pelvimetry, I only wish to repeat what I have often before said, and that is that it may be utilized with great advantage in detecting the pelves which through being small or illformed are liable to impede parturition or render it impossible.

External pelvimetry, intelligently practised, furnishes presumptive evidence which is of certain value, particularly as it can be employed without the internal examination. Only the vaginal examination, and possibly a test of the second and third stages of labor, can determine for us the entire embarrassments which may arise from disproportion of child and the internal diameters of the pelvis.

For anyone who may be interested and is not cognizant of the work which I have done in this line, I beg to refer him to my original paper upon this subject as published in the *Annals of Gynecology and Pediatry*, 1895, and also to a paper presented to the American Gynecological Society in 1900. I wish to say that so far as I know, neither of the papers referred to attracted much attention or appear to have dislodged teaching pelvic mensurators from what I, of course, regard as an old rut.

Dr. J. Clifton Edgar—It seems to me Dr. King is taking a rather pessimistic view of this matter. I cannot see that there is really very much difference of opinion in regard to the relative proportion of these diameters, and practically no departure between the relative proportion of the conjugata vera and the conjugata diagonalis, the transverse diameter and the conjugata diagonalis of the inlet.

I am familiar with the work of a good many of the examining boards. He speaks of the Examining Board in Washington. I have had conversations with a number of the members of other boards, and it is my impression that there is no medical examining board to-day that expects the candidate to give the fractions of an inch or the fractions of a centimeter, and what the ordinary examiner expects to-day is that the student or candidate, whatever the position may be for which he is being examined, shall give the relative proportion of the pelvic inlet as well as the relative proportion of the fetal head. Take the whole list of measurements as given by the essayist, and there are some departures, varying from a fraction of an inch to one-eighth of an inch. With regard to the transverse diameter, every

student understands that the transverse is encroached upon by the soft parts. The obstetric oblique diameters of the inlet are the longest. In my experience in examining candidates for various positions, undergraduates or men for internships, they usually come up with the understanding that there is a relative proportion, and I would never think of holding them to one-quarter or one-half of an inch.

Dr. Harris referred to measurements of the crests and spines. I am free to confess that I attach very little importance to these measurements as indicating much deformity in the cavity itself. There is a wide departure between anomalies in measurements of the crests and spines and pelvic cavity. I think a great many obstetricians are inclined to-day to attach less and less importance to the width of the crests and spines than formerly, however they differ in their estimates of pelvic deformity; and to come to the root of the matter, we should find out what is the anteroposterior diameter, or what is the transverse diameter of the pelvic inlet with relation to deformity.

I do not take the same pessimistic view as Dr. King does in this matter, because we really seem to-day to have a consensus of opinion as regards relative proportion. My own measurements in obstetric cases, I will say, are practically those of Lusk. Before his death we talked this matter over several times as having a bearing on teaching, and I understood that his measurements were averages which were obtained from examinations of hundreds of cases.

Dr. J. Whitridge Williams.—There can be no possible objection to Dr. King's suggestion of determining upon a normal pelvis and normal head for purpose of teaching, but whether such a method would be adopted by others to any great extent is questionable. Should it be adopted, it would materially simplify matters for the student as well as the teacher.

At the same time, I should like to take issue with what Dr. King has said concerning the extent of racial differences. In Baltimore, where my material is almost equally divided between blacks and whites, I have found that marked racial differences exist and to a much greater extent than indicated by Dr. King's figures.

Several years ago I reported to this Society the results of pelvic mensuration in two thousand cases, which were based upon

both internal and external pelvimetry, and stated that contracted pelves occurred three times more frequently in colored than in white women.

If one attempts to base his idea as to the size of the pelvis of colored women upon external pelvimetry alone, he must come to the conclusion that at least 75 per cent. of them have abnormal pelves. On the other hand, when one examines them internally and measures the diagonal conjugate, he finds that only 20 per cent. of them present internal measurements below the normal limit. My experience has taught me that while the pelvis of the colored woman is much more frequently contracted than in the white, the chief racial difference consists in a less marked flaring of the iliac fossæ and a greater thinness of the bones in general, thereby bringing about a marked decrease in the distances between the iliac spines and crests, and a lesser one in the distance between the trochanters and Baudelocque's diameters.

Moreover, we find a similar difference between the size and weight of the children in the two races. In our material we found that the average weight of the colored children was one-half to three-quarters of a pound less. At the same time their heads are smaller and much more readily compressible, and measure about one centimeter less in the various diameters than in the whites. Indeed, I do not think I should go far wrong were I to say that if colored women had children as large as the average white woman, I should be compelled to perform several Cesarean sections a month, instead of four or five in the course of the year, as at present.

With reference to the table presented by Dr. Harris, I agree with what Dr. Edgar has said concerning it. I consider that its employment would lead us to less accurate conclusions than the methods of external pelvimetry now in vogue. Moreover, admitting that the table would be correct when applied to white women, I am sure it would lead to absolutely erroneous conclusions in dealing with colored women.

Dr. Ely Van de Warker.—I assume it is one of the functions of this Society to reach final conclusions and to adopt methods which will tend to a consensus of opinion in regard to the matter which appears to the several gentlemen who have indulged in the discussion on Dr. King's paper to have some

practical importance. Take the dissenting views of Dr. Williams or of Dr. Edgar on Dr. King's paper, and they show that there is lacking a general consensus of opinion concerning pelvic measurements; and believing what I regard as one of the functions of this Society in a subject under discussion like this, I move that the President appoint a committee of three to reach, if possible, a consensus of opinion bearing upon the methods and tables concerning pelvic diameters, and that this committee shall have power to bring the matter before the next meeting of the Society.

(This motion was seconded and carried, and the Chair appointed Drs. King, Williams, and Davis as the committee.)

Dr. King.—With regard to Dr. Edgar's objection, he stated that we are nearly right already; that the proportions are nearly alike, and that I took a rather pessimistic view of this subject. After all, if there are only little differences, why not make them all exactly alike for the benefit of the thirty thousand students in this country and a hundred thousand others all over the world? While they are nearly right as they are, let us make them quite right, and get rid of these miserable small fractions which are utterly useless and which embarrass medical students very much.

Dr. Harris' table of measurements is extremely interesting for determining the contractions of the pelves, and their relations to deformities. The only object for which we measure these normal pelves and normal heads is for the purpose of studying and understanding the physiologic mechanism in normal cases. But just as soon as we get an abnormal case, where the departure is so great from the normal, then these normal measurements are of no use. Let us make them all alike, so that all authorities will agree.

THE VALUE OF NON-OPERATIVE LOCAL TREATMENT IN GYNECOLOGY.

By Willis E. Ford, M.D.,
Utica, N. Y.

No one will deny that greater good has come from the surgical treatment of diseases peculiar to women than was ever dreamed of by the early gynecologists who did not operate. To compare results of surgical treatment with those obtained by non-operative measures is absurd. The contrast between the new and the old methods is too great to require argument. Is it true, however, that surgery does all that can be accomplished in the treatment of diseases of women? One ought not to be loth to write about the non-operative treatment if there is anything in it, and yet this seems to be the case on the part of those best qualified to speak on this subject. The pathology of these disorders, learned by pelvic and abdominal surgery in the past few years, is better and clearer than was ever discovered post-mortem. It ought to follow that the causation and natural laws of these diseases are better understood by the operators than by any other class of men. For obvious reasons the methods differ considerably from those that hold good in surgical disorders in other regions of the body. It is this fact that makes a specialty of our work. If surgery alone is sufficient to deal with all diseases of women, then this specialty has no longer any reason for its existence. It does not matter how much sentiment we may have about the name gynecology, or how seriously we may insist that it is a specialty

the minute we concede that there is no such thing as non-operative gynecology we join the ranks of the surgeons, and relegate sick women who do not require surgery to the general practitioner.

These platitudes will not influence men one way or the other if they are far along in their medical careers, but the attitude of a great national society on a subject of this sort is important. The very fact that this subject was selected by the Committee of Arrangements for discussion is significant. Not long ago one of the distinguished members of this Society said to me that his office had come to be a place where operations were arranged for and nothing more. This was not because he did not care for an office practice, but simply because patients came only for surgical advice. Probably this condition was brought about by his neglect of minor ailments that formerly came to him for treatment, and partly by the general sentiment in the community that it was useless to consult him for any other than an operative case. This ought not to represent gynecology, and I do not believe that it does. This doctor had enough to do, but he was better qualified to care for the minor ailments that had not yet become surgical than the men who were doing this work about him.

It is a common thing for all surgeons to say that certain operations were the result of a neglected condition which might have been removed without serious consequences if the case had been seen early. This applies not only to those more important disorders that ultimately may require surgical treatment, but there is a large number of women who suffer from the annoyance, inconvenience, pain, irritation, and discomfort of simple ailments without there being any serious menace to life, and who become professional invalids, developing the habit of introspection, losing control of themselves and the power to exercise the will, and the condition becomes what is known as neurasthenia. A strong, well-borne woman with a stable nervous organization never be-

comes a neurasthenic, no matter what her ailments are; but the weaklings are really in the majority, and these conditions, which could be easily removed by medical treatment directed to the source of local irritation, may and often do lead up to serious nervous disorders unless judicious management is given. If there is no other reason why non-operative treatment of gynecologic cases should be continued in the hands of skilful, conscientious men, the one reason that neurasthenic women are likely to have local disorders that need rational care in order to prevent them from going entirely "over the bay" is sufficient.

Neurasthenia is not a disease; it is a condition of unstable nervous organization to which the person is born, and while in good health, comfortable surroundings, and under no great stress of the emotions, these people live like others, without the development of symptoms which are recognized as those of neurasthenia, yet, under slight though continued pain, irritation, or other misery which constantly calls attention to their ailment, they develop the invalid habit. The cure of neurasthenia must begin before the mental symptoms have developed, and the strongest plea which can be offered the gynecologist to care for the early manifestations of local uterine disorders without surgical interference is that unless these people are skilfully managed by rational men they soon become self-centered, introspecting, and nervously unbalanced, readily developing the invalid habit. It is probably true, also, that when this nervous habit has been established, and years have passed, the more serious pelvic disorders have developed requiring surgical interference. Then it is too late to do more than restore anatomical conditions, but this does not cure. It is only two or three years ago that some enthusiastic oculists claimed that epilepsy could be cured by the proper adjustment of glasses in a certain number of patients. They were given the opportunity to try this theory at the Craig colony for epileptics at Sonyea, New York. After more than a year's trial the report was made

that not only was epilepsy uninfluenced for the better in any considerable number of cases, but some were absolutely made worse, and there were no cures recorded.

That the nervous habit cannot be cured by surgical procedure has been proven by the fact that the removal of diseased ovaries and such like operations on epileptic or neurasthenic women has not cured them. The argument, therefore, is that in those ailments which tend to disturb the emotions, especially in ailments connected with the reproductive organs of either men or women, the serious thing is not the pain experienced, but the permanent invalidism which is brought about by protracted local sensations, and which in a large number of cases disturb the mental equilibrium and has come to be called neurasthenia. If nothing but surgical gynecology is to be thought of these early cases are necessarily either neglected or are treated by men who are general surgeons or general practitioners, and who are, perhaps, less competent to judge of the trend of the disorder, the significance of the symptoms, and the rational treatment of the conditions than are those who have been educated by a long surgical practice.

It is true that surgery removes the cause of many disturbances of the emotions which constitute the sum total of the symptoms called neurasthenia, but if the mental and bodily habit is thoroughly established, and if the women are professional invalids, surgery may relieve, but does not cure a single case. All men know that the reason why women consult a gynecologist or their family physician for a local disorder is usually some symptom which in itself is unimportant as bearing upon the safety or longevity of the patient. These symptoms are quite as likely to be conditions of irritations which rational local treatment can relieve, but which if neglected or improperly treated may develop into more serious disorders requiring surgical procedure. A vaginitis or a purulent leucorrhea or an irritable condition of the urethra is more likely to bring a patient to the physician

than a fibroid tumor or an ovarian tumor or a cancer of the uterus. In many of these cases a man who is operating for the major disorders may think that the case is too trivial to occupy his time, and yet the conditions which cause them would be most easily understood by men who are dealing also with the graver disorders, the result of infection farther up in the genitourinary tract. Is it not probable that the man who appreciates the dangers of such conditions would more skilfully care for such patients than the general practitioner who is not operating in the pelvis and who does not see the results of infection in the upper tract of the genitourinary apparatus? It is perfectly true that judicious local treatment by hot douches, glycerin, and ichthyol tampons, or by pressure, etc., may often prevent the extension of simple disorders, so that grave surgical procedures are unnecessary. Gonorrhea furnishes a striking example of the truth of this statement.

It is not worth while to specify the treatment necessary for the simple inflammatory conditions of the urethra, labia, and vagina, for papers on these points are to follow. But take the case of a sudden dislocation of the uterus backward, with the accompanying prolapse of the ovaries in young women. If seen early and the simple reposition of the organs is secured, with perhaps the temporary support of a pessary, or the recumbent position, with tampons, the ligaments which have become overstretched very soon regain their power of control. It requires skill and some patience to do this, and it ought to be very much better done by surgeons who have in mind the grave disorders, degenerated, adherent ovaries, protracted congestion of the uterus, and the permanent stretching of the round ligaments, which later on in the case make the necessity for abdominal section. I am convinced that a large number of cases requiring surgical interference, either in the removal of diseased ovaries or for the reposition and fixation of the uterus, with, perhaps, resection or partial ablation of the ovaries or tubes, could be pre-

vented if the skilful gynecologist saw the cases early enough to institute non-operative procedure. None of us doubt or hesitate at all in performing an abdominal section in cases that have developed out of displaced organs, when time enough has elapsed to produce pathologic changes that cannot be relieved by non-operative treatment. The use of electricity if properly administered and with a sufficient current early in certain cases gives as brilliant results in relieving adhesions, developing an infantile uterus, and in helping to straighten a flexure as does any surgical method later on in the case. Appropriate medical treatment which relieves conditions of permanent, continuous constipation, or of acid, irritable urine, are quite as important as anything we can imagine regarding the development of uterine disorders.

Medical treatment in the preparation of cases for operation becomes a matter of routine, and is often relegated to the superintendent of the hospital or the house physician where our operations are done. That this preparation should be continued long enough to secure a fairly normal condition of the blood and of the secretions goes without saying, and except in emergency operations ought to be as carefully conducted as is the operation itself. The whole subject of surgical shock, which is the condition that every man considers when he does a major operation, is still a mooted question as to whether it is due to hemorrhage or to the kidneys, which ought to have been attended to before the operation was performed. A few cases occur every year in which the element of surgical shock is discussed because of the behavior of the heart or of the kidneys. A careful investigation of all facts will often show whether there has been a previous myocarditis. Obscure conditions of this disease, however, cannot always be determined by physical examination.

I operated upon a woman this past year who told me that she had two sisters who died in a hospital, in each instance

within a few hours after a surgical operation had been performed. I was unable to discover any abnormal condition of the heart, or ovaries, or of the kidneys, though I kept the woman under careful observation for several days, and had her examined by several physicians at different times. She bore the ether perfectly well, but went into a collapse immediately after the operation, and for some hours there could not be felt any radial pulse, and she required artificial respiration, was cyanosed, and death seemed imminent. Cardiac stimulants, salines, and oxygen failed to restore the circulation, and adrenalin was administered hypodermically, which restored the pulse to a sufficient volume so that it could be counted. I have no doubt that if this woman had been operated upon without a long preparatory course of treatment and without due consideration of the story which she told me of her family I should have lost her.

As to the third proposition—postoperative treatment—I suppose all of us will say that in all but the simple cases which get well under the hands of the skilled nurse the care which is bestowed is quite as important as the surgery itself. This must be said of all cases of plastic surgery about the vagina, and I am confident that the failure, either partial or complete, in these cases is, in the main, due to the neglect of the surgeon or to the incompetency of the nurse. Of course, a nurse cannot be held responsible unless the physician is particular in giving the most minute directions as to the management of the nursing after he has left them. Those of us who have competent assistants and superintendents in the hospital where we work come to leave this part of the case in their hands, but it is none the less true that the responsibility rests with the surgeon who does the operation, and the postoperative treatment often is as important as the surgical technic.

THE VALUE OF NON-OPERATIVE LOCAL TREATMENT IN PELVIC DISORDERS.

By W. P. Manton, M.D.,
Detroit.

The worth of any procedure should be estimated not only by immediate effects, but, in comparison with other methods, by final results and whether these are as good or better than can be obtained through other measures or secured with less serious risk to the individual.

If experience founded on pathologic knowledge has taught anything it has conclusively proved that in the more important diseases of the pelvic viscera surgery alone can offer hope of amelioration and cure. While granting this, however, the question may well be asked: Has the overshadowing of medicine by its sister craft in ultimate results *always* proven the best and most satisfactory solution of the problems involved in the relief and cure of pelvic disease?—a question, as Dr. Hunter observes, "which is not so much, can we accomplish such and such by a given method, but, when done, is the result better than that to be obtained by the plan which it is proposed to supplant?"

The impetus to study and research inaugurated by the introduction of antiseptics into surgery has led to marvellous achievements. Ocular inspection has shown the ravages of disease *in situ* in the living, and abundant pathological material worked out in the laboratory has demonstrated cause and effect and established treatment for the most part on a sounder and more rational basis.

With such a debt to surgery it is no wonder that the treatment of gynecologic disorders should have developed largely along these lines, to the neglect and almost exclusion of the older methods of local applications and general treatment.

In ignoring the benefits to be derived from medicine, however, I am convinced that surgery has gone too far and overshot the mark, and that the present tendency to operative measures in all conditions affecting the pelvic organs cannot be ascribed as much to the good which surgery, rightly directed, is capable of accomplishing as to other elements which have entered into the case.

Three of the factors which among others at the present time are largely responsible for the neglect of medical gynecology are:

1. The average physician's lack of knowledge in the accurate diagnosis and local treatment of pelvic disease.
2. The allurements and fascinations of surgery.
3. Competition in the field of practice.

While no mystery surrounds the treatment of pelvic disease, it will be acknowledged by all that a special training and experience is requisite for success in this department of medicine. That the recent graduate enters the field poorly equipped in this respect is largely due to the faulty or inadequate teaching of the schools.

While it is true that no amount of theoretic instruction can impart a *tactus eruditus*, still anyone can acquire a knowledge of the primary principles underlying the correct interpretation of gynecic ailments if opportunity is offered for the examination of patients under competent direction. The sense of touch must be educated to familiarity with the normal structures, and by practice to differentiate morbid conditions in their various presentations. The physician must know what he feels, and be able to correctly interpret those conditions with which he has to deal. Capable of this, he is then in position to intelligently consider the question of treatment. Ignorance of pathologic processes, unfamiliarity

with methods of examination, inability to determine the nature of conditions present, together with lack of knowledge of the remedies indicated in the case, formerly led to the routine employment of the iodine swab and the glycerin tampon, to the discouragement of the patient from unrelieved symptoms and the dissatisfaction of the physician at unsuccessful efforts. Hence, the gradual fall of local treatment into disrepute, and, in recent years, a too frequent resort to surgery, often as a cloak to incompetency.

In the best of hands the results from local treatment in pelvic diseases are frequently slow in manifesting themselves, and discouragements are often encountered, but in suitable cases persistent effort will ultimately attain the desired end.

Viewed from the seats, the most delicate and complicated operations in the hands of a master often appear so simple and easy of execution and so certain in results that the student who has been taught little or nothing of the possibilities of materia medica looks upon the treatment of pelvic disease only from the concrete side of surgery. Diagnosis and prognosis are unknown quantities, and the operation itself stands for the sum total. Fascinated by the glitter of instruments, the intricacies of detail, and the elegance of technic, and under the spell and glamour of the deft and brilliant operator's personality, the welfare of the patient receives scant consideration, and the student becomes imbued with the idea that in surgery and surgery alone lies the broad and unobstructed road to success and future reputation. The effect of all this, as Dr. Jenks so truly pointed out in his paper two years ago, is to "bring into existence many surgical and gynecologic neophytes who attempt the kind of work that only masters are equipped for." To-day it requires a greater courage to treat disorders of the pelvic organs conservatively than it did fifty years ago to open up the peritoneal cavity.

The large number of graduates sent out yearly from our medical schools increases competition in the field of practice,

and the question of existence becomes one of vital importance to each individual. The public does not discriminate, and in the profession itself there is a growing tendency to measure a man according to his financial returns. Commercialism has, to a large extent, entered the practice of the day, and the survival of the fittest depends not so much upon ability as on mercantile shrewdness. The higher ideals inculcated by the fathers of medicine as to professional responsibility to patients have given place too largely to personal and selfish aspirations. Men of ambition, too often unwilling to reach the heights of professional success by the slow and plodding ways of merit, seek at a bound to occupy the seats of the mighty and to add to their records and bank accounts by buying patients on the percentage or fee-splitting plan. Young men entering the profession look to success for daily bread, and, seeing in operative work one of the surest means to speedy advancement, to larger pecuniary recompense, and to a more rapid elevation to the peerage of greatness, plunge into the surgical arena without a single thought as to fitness or of ultimate results.

These are some of the reasons why local and general treatment in the pelvic disorders of women have been left behind in the race, and why surgery has raised the cry of the passing of old-fashioned methods—medical gynecology. But in this very cry there is a ring of uncertainty, for true surgery recognizes its limitations, and realizes its frequent dependence upon medicine in accomplishing its cures.

In no one of the specialties is a broader knowledge and experience in general medicine demanded than in the practice of gynecology. Women have been led to the belief, and this is often fostered by the physician himself, that nearly all the ills to which their flesh is heir originate in the pelvis, and lack of diagnostic acumen and want of judgment have too often sent the patient to the operating-table when a greater familiarity with general medicine and local therapeutics would have resulted in restoration to perfect health

without recourse to the knife. The question before us, therefore, resolves itself largely into one of honest diagnosis, the differentiating of diseases which are purely surgical from those in which local and general treatment will effect a cure.

The close relationship between the pelvic organs and other parts of the body often renders local treatment alone less effective than when combined with proper general treatment, and the physician who undertakes the cure of pelvic disease without taking cognizance of general conditions is doomed to disappointment and failure. Many affections also simulate pelvic disease, and the application of local remedies under such circumstance is, of course, the height of absurdity. Neurasthenia, with its backaches, bearing-down sensations, and pelvic and abdominal pains, catarrhal enteritis, errors of nutrition, malaria, and anemia in its multiform manifestations are illustrations of these counterfeit gynecologic presentments.

The objects of local treatment are the relief of pain and irritation, often of a reflex nature; the allaying of congestion and inflammation, the absorption of the products of inflammation, and the reposition of displaced organs. In the regulation of the uterine functions, in congestions and mild inflammations of that organ and in surrounding parts, and in displacements of the uterus, with and without adhesions, the application of proper local treatment is of signal value, while in prolapse of the tubes and ovaries, even in the presence of extensive adhesions, but without ascertainable morbid changes in the organs themselves, vaginal tamponade offers the simplest and most efficient means of reposition and cure.

In the practice of local treatment the older observers confined their remedies within too narrow limits, and from ignorance of pathology often resorted to harsh and uncalled-for methods. The intrauterine employment of caustics and other drugs, especially without previous dilatation of the cervical canal for drainage, is at present rarely practised, and, in general, it is to be condemned, since better results,

without the dangers, can be obtained by milder remedies applied outside the cervix. Broadly speaking, it may be stated that almost every drug in the pharmacopeia can be employed in local treatment, the particular remedy to be selected depending upon the nature of the disorder present and the action which it is desired to obtain.

In the foregoing remarks I have attempted to point out why non-operative local treatment of pelvic disorders has fallen into disrepute, what essentials are necessary to success by this method, and, briefly, some of the conditions in which local applications have given satisfactory results in my hands; and I further desire to express my own firm belief in the value of this method of treatment in suitable cases. In closing, I cannot offer a better text for thoughtful consideration than the wise and liberal doctrine enunciated by Skene:

"The science and art of medicine and surgery, in their highest development, should be above all party questions, and those who place a just estimate on both branches of the healing art and employ them without predilection and prejudice are the most successful and reliable. Unreasonable devotion to either medicine or surgery is wrong."

THE VALUE OF LOCAL TREATMENT PREPARATORY TO OPERATION.

By H. C. Coe, M.D.,
New York City.

By preparatory treatment I understand such local applications as either allay inflammation, assist an anatomical cure to be completed by the operation, or render the latter more successful from a clinical standpoint than it might otherwise be. The subject being limited to the non-operative side, it is obvious that the discussion must be confined almost entirely to treatment preparatory to plastic operations within the vagina.

Having received my early gynecologic training in a school in which considerable emphasis was placed upon the importance of such "preparation," I may be criticised when I state frankly at the outset that I now regard most of the lessons then inculcated as opposed to the ordinary facts of anatomy. It would ill become a pupil of our venerated Fellow, Dr. Emmet, to cast discredit upon his pioneer work in gynecology. Whatever modifications our views have undergone with regard to his theory of pelvic pathology, many of his clinical deductions are as sound as they ever were, and we have not yet outgrown the influence of his acute, logical mind. It is pleasant to feel that he has not had to wait for a future generation to do him honor.

But, while accepting his views as to the value of the hot douche in some forms of acute pelvic inflammation and of the glycerin tampon to assist in the absorption of exudates, as long ago as 1886 I expressed skepticism with regard to the neces-

sity of extended preparatory treatment before operations on the pelvic organs, taking the ground that long-standing anatomic changes in and around the uterus and adnexa were not affected by hot douches, applications of iodin, tampons, etc. I assume that acute and subacute inflammations of the adnexa (then usually known as "cellulitis") are naturally contraindications to trachelorrhaphy alone. This is now ancient history. Doubtless the haste which characterizes modern life is felt in surgery, and we too often operate prematurely, but certainly there are few patients nowadays who would submit to weeks of preparation before repair of a lacerated cervix and perineum, however long they might demur before resorting to laparotomy. Nor is it necessary. A condition that has existed perhaps for years and in which an operation is clearly indicated can be cured only by operation. I note in one of the most recent textbooks on gynecology the old familiar advice to puncture cysts, paint erosions with iodin, etc., before performing trachelorrhaphy. Why not, we would naturally ask, amputate the diseased cervix at once, thus removing all the affected tissue, instead of wasting weeks with tentative palliative measures?

The same criticism applies to operations within the abdomen. Would the general surgeon expect a diseased and adherent appendix to become a more favorable subject for an interval operation by subjecting the patient to a long course of preparation for months after acute symptoms had subsided? As long ago as my hospital days observations in the examining-room and dead-house convinced me that adherent uteri and adnexa could not be rendered freely movable by any amount of non-surgical treatment. I have seen it persisted in for years, and on finally opening the abdomen it was evident that all that the tamponade had accomplished was to distend the vagina and elevate the pelvic organs *en masse*, without separating a single adhesion or restoring diseased organs to a normal condition. I do

not deny that we may operate too often at the present day, and may not have the patience of our predecessors in giving palliative treatment a fair trial; but I do affirm that our accumulated clinical experience has proved that in most cases in which "preparation" was formerly regarded as a *sine qua non*, just as good results are obtained by proceeding without this delay.

I have a vivid remembrance of the orthodox course of treatment pursued in a case with the commonly associated conditions, viz., laceration of the cervix, with corporeal endometritis, laceration of the pelvic floor, prolapsus, with cystocele and rectocele. To repair any two of these lesions at one sitting was regarded as quite unjustifiable—in fact, I recall the case of a patient with these conditions under my observation when a resident physician in a special hospital, who had four separate operations, each with a prescribed interval of "preparatory" treatment for the next séance. She was eventually discharged in fair condition, wearing a pessary, but after a stay of at least three months, instead of as many weeks, as at present.

The influence of this teaching was felt throughout the profession; witness the elaborate directions for local treatment in the monograph on *Minor Gynecology* by our late Fellow, Dr. Mundé. That we really believe little in it is proved by the routine office treatment of everyone in this audience.

To refer again to the most familiar example. We used to be taught that a lacerated and eroded cervix with general induration and cystic degeneration must be subjected to a certain course of preparation before one could venture to repair it, with any hope of anatomic and symptomatic cure. Hot-water douches, applications of iodin, puncture of cysts, local depletion (whatever that may have meant)—all these were used to "prepare" the patient for operation, instead of amputating and removing the disease at once. If an old parametric cicatrix were present a vigorous attempt

was made to cause its absorption by means of iodin and glycerin tampons. How often this supposed "cellulitis" was really a thickened and adherent tube we learned long ago at the operating-table. I am very far from desiring to remove the ancient landmarks, but I do plead for a sound anatomic and clinical reason for every procedure in gynecology, whether surgical or non-surgical. Reverence for tradition is one thing, but common-sense is another.

I have the utmost respect for hot douches and ichthyol or boroglycerid tampons in the treatment of pelvic exudates, but I believe that these are misapplied when their use is persisted in in cases in which laparotomy has taught us adhesions can be separated only by the fingers within the abdominal cavity.

Every gynecologist can testify to the wonderful absorptive action of the lymphatics in so-called chronic cases, but the conscientious observer must also admit that he has wasted his own and his patient's time and patience in attempts to "prepare" for an operation which ought to have been done at once. Not a few unfortunate cases of ruptured ectopic pregnancy have been due to this ultraconservatism. I assume that there can be little difference of opinion with regard to the advisability of delay and expectant or local treatment in certain acute and subacute inflammatory affections of the adnexa. Hasty operation under these circumstances may bring failure, if not disaster. I am referring rather to the so-called "chronic" cases in which some still advise local preparatory treatment, instead of meeting the obvious indications without delay.

I have seen too many cases of inoperable carcinoma of the cervix follow a long course of applications in the hands of the general practitioner to have any sympathy with such medical gynecology. And I may add that I have observed too many patients with simple leucorrhea treated indefinitely with intrauterine applications until they developed into obstinate cases of endometritis to favor such conservatism.

So far as my own personal opinion is concerned, I would prefer either to operate upon such a patient or to let her alone.

While on this subject it may not be amiss to suggest that more can often be accomplished by judicious general than by local treatment preparatory to an operation. The heart, lungs, kidneys, the relaxed abdominal muscles in cases of enteroptosis, the condition of the bladder and bowels—all these deserve as much attention as the local changes to which I have referred.

Personally I have rejected the use of the term "chronic" in connection with disease of the pelvic organs. What is chronic endometritis, metritis, salpingitis, oophoritis but hyperplasia of epithelium, glandular, or fibromuscular tissue, the result of a former acute or subacute inflammatory process, or long-standing congestion? And how can we expect a *restitutio ad integrum* from local applications? These questions have never been answered to my satisfaction in any of our recent text-books.

One class of cases must be excepted from this criticism. Those of us who witnessed the many successful operations for complicated vesicovaginal fistula at the Woman's Hospital (conditions now so rare in this country) must admit that the admirable results were due not only to the skilful technic of the surgeon, but to the careful course of preparatory treatment to which patients were subjected to cure the existing cystitis, divide cicatricial bands, dilate the vagina, etc. And there is no doubt, too, that the care bestowed upon patients for days, and often weeks, previous to the repair of complete laceration of the perineum was responsible for the success of the operation in the preaseptic period when such dreadful results followed neglected obstetric cases. I have no doubt that we would do better to pay more attention than we do to the stretching and division of cicatricial tissue preparatory to our operations for atresic conditions the result of traumatism.

THE VALUE OF POSTOPERATIVE LOCAL TREATMENT IN GYNECOLOGY.

By J. Riddle Goffe, M.D.,
New York City.

By postoperative local treatment is understood the application of such local measures for relief as are usually employed in the routine local treatment in gynecologic cases, namely, hot-water vaginal douches, vaginal tamponade, and topical applications, both to the uterus and to the vaginal vault.

My experience confirms me confidently in the opinion that much can be accomplished by local treatment, *per se*, in all the various inflammatory conditions that are met with in the female pelvis. Neoplasms and cystic tumors are beyond the scope of such treatment except in the complications attending them; but displacements of the uterus, prolapsed and sensitive ovaries, congestion and inflammation attending these conditions, to a greater or less extent can be relieved symptomatically by non-operative local treatment. Such conditions when complicated even by well-organized adhesions can be relieved, and the adhesions themselves dissipated in many instances without operative procedure. Of course, all of this comes under the head of surgical treatment, but for the purposes of our discussion I have drawn the line between surgical and operative treatment, between cases demanding anesthesia for the operation and those that do not; in other words, between office cases and hospital cases demanding anesthesia. Large displaced hyperplastic uteri can be reduced to normal size and healthful condition, and restored to their

proper position in the pelvis by local and mechanical treatment. Acting on the logical conclusion that if local treatment will relieve these conditions when present it would certainly be of service in preventing them, I have been in the habit recently of instituting local treatment as soon after operative procedures as the condition of the tissues involved in the operation would permit.

The condition that is universally recognized as being most commonly productive of pain is that of plastic adhesions holding the organs in fixed and immobile positions. In many instances these adhesions can be made to disappear by prolonged and systematic treatment with tamponade and hot-water douches. Adhesions of long-standing that have become thoroughly organized, in many instances will resist all treatment except that by the scissors or the knife, but these are the exception rather than the rule. I am using the treatment, therefore, to prevent the development after operations of similar conditions. Perhaps the efficiency of the treatment may be best presented by narrating a few typical cases in which the benefit of the treatment seems to have been demonstrated.

Case I.—This case presents to my mind conclusive evidence of the benefit of local treatment in cases in which adhesions existed at the time of operation and the condition left after operation favored the reformation of them, which would entirely have frustrated the object of the work. Also in cases of acute infection of the uterine appendages it is a nice question to determine how far active surgical interference is advisable. This case is of interest in this connection. Mrs. S., aged thirty-one years, the mother of two girls, six weeks after her second confinement was infected with gonorrhea. Six weeks later, after entering one of the prominent New York public hospitals, she was told that the only thing that would cure her was a panhysterectomy. To this she would not consent because, as she said, she wanted a boy baby. She thereupon left the

institution and presented herself a few days later at my hospital clinic. She had a temperature ranging from 100½° to 102°, a foul tongue, irritable stomach, and upon examination a mass as large as one's fist involving the uterine appendages of the left side, a large adherent tube on the right side and prolapse of the corresponding ovary were discovered. She was suffering from constant pain in the pelvis and an effusive foul discharge. After listening to her story and her desire for an heir, I told her I thought it quite possible that I could save the right ovary and tube if the operation were done promptly, and thereby make it possible to attain her heart's desire. She consented. The uterus was thoroughly curetted, swabbed with pure carbolic acid, and packed with iodoform gauze. The cul-de-sac was opened, adhesions gently severed with the finger as far as they could be reached and some iodoform gauze firmly packed in the hollow of the sacrum, being carried as high as the promontory. Anterior vaginal section was then done, the remaining adhesions surrounding the inflamed mass separated, and the fundus of the uterus delivered into the vagina. The appendages which were the least involved (the right side) were then drawn down; the tube was found enlarged, inflamed, and occluded, the fimbriæ being universally adherent to the ovary. Under an irrigation of hot saline solution the ovary was washed, the fimbriæ separated, massaged, and opened out. The contents of the tube, which consisted of a few drops of muco-pus, was milked out, and a silver probe loaded with tincture of iodin carried into the tube the full length of that organ. The fimbriæ and ovary were also brushed lightly with iodin. These were replaced and adjusted upon the gauze, which had been inserted in the cul-de-sac. The involved appendages of the left side were then brought down to the vulva, a collection of pus involving the ovary and tube was set free, and the appendages removed with the angiotribe. The uterine stump of the tube was dissected out and the horn of the

uterus stitched. The uterus was then restored to its normal position, the peritoneum and bladder adjusted, the longitudinal vaginal incision stitched, the transverse incision being left open, and the vagina packed with gauze. The tube which was not removed was intensely inflamed, its walls thickened, and the raw surfaces left in the pelvis very extensive. Ordinarily it might justly be expected that adhesions would reform and pain be reproduced. The gauze which was packed in the cul-de-sac was gradually removed day by day after the fourth day, the last of it coming away at the end of the seventh day. Five days later, in order to avoid any congestion that might follow the cessation of drainage by removal of the gauze, the patient was placed upon tampon treatment of ichthyol and glycerin, the tampon being removed and reapplied every second day after a hot saline irrigation administered while on the operating-table. This treatment was continued for two weeks, at the end of which time, namely, at the end of the fourth week, she was dismissed from the hospital. This operation was done in November. I have seen her several times since and have been highly gratified by the result. The uterus and appendages are freely movable, and although there are as yet no evidences of the prospective heir, the patient is anatomically at least in a perfectly normal condition as far as the uterus and the appendages of the right side are concerned. In addition to the local treatment the patient was also kept in the Fowler position, and received the benefit of more perfect drainage thereby.

I have had one case similar to the above, in which I have interfered in the acute stage and have obtained equally satisfactory results, the patient being subjected to the same treatment. I regard this, then, as a typical illustration of what may be expected from this line of postoperative treatment in a most critical class of cases.

In cases that are operated upon for the simple symptom of sterility it is found frequently that the obstruction or the

obstacle to impregnation consists in cobweb adhesions that either bind the fimbriæ together or kink the tube in such sharp flexures as to obstruct its lumen. In subjecting such cases to operative interference, of course the object to be aimed at is to prevent the reformation of these adhesions. If the circulation is stimulated to its highest pitch and all stasis obviated, we have secured a condition most favorable for recovery and avoidance of redevelopment of adhesions. This is accomplished by the hot douche and the tamponade. It has become my routine custom to subject my patients after vaginal section, when performing it for the relief of the above conditions, to this local treatment on the twelfth or fourteenth day after the operation, and continue it as long as there seems any probability of plastic exudate being thrown out and adhesions forming. In some instances, even after months have passed and impregnation has not occurred, a short course of this treatment seems to be effectual in establishing such normal conditions as to favor impregnation. The following illustrates the benefit of this work.

Case II.—Mrs. A., of West Virginia, was referred to me by her family physician for pelvic pain and sterility April 14, 1902. She was suffering from backache and spasmodic pains in the pelvis, dyspepsia, and general disability and nervousness. She had been subjected to an artificially induced miscarriage two years previous on account of persistent nausea and vomiting of pregnancy. Unfortunately she became infected and nearly lost her life. She had not regained her health since that time. She was formerly a fine whip and enjoyed horseback riding, but since the miscarriage has been unable to indulge in it on account of the distress produced thereby. On examination I found a retroverted uterus, prolapsed and diseased appendages of both sides, with universal adhesions. Neither the uterus nor the ovaries could be lifted from their bed. Anterior vaginal section was performed, tubes and ovaries freed from their positions, various cysts punctured with the

Paquelin cautery and part of the left ovary resected. The tubes were massaged under saline irrigation and opened. The round ligaments were then shortened to relieve the displacement. The patient made a satisfactory recovery and returned to her home at the end of the fifth week. No postoperative treatment of the character under discussion was given in this case. I heard from the patient from time to time during the succeeding year. She steadily regained her health, but did not become pregnant. In April, 1903, she and her husband returned to me to see if I could relieve the cause of her continued sterility. The patient was very nervous, and inclined to be hysteric. The uterus was in normal position and movable, but the appendages of the left side were slightly prolapsed, sensitive, and adherent. I placed her on treatment of ichthyol tampons, hot douches, plenty of fresh air, and general hygienic regimen for four weeks. She then skipped her menstrual period, but thought it was simply a delay from which she had frequently suffered. After going over the time for two weeks further, symptoms of pregnancy appeared, and I sent the couple home to await developments.

One month later I was informed by post that menstruation had not appeared at the expiration of the intermenstrual period, and there was no doubt of the pregnancy. Some nausea and vomiting were present, but no such violent symptoms as had presented themselves at the previous pregnancy.

The following letter has just been received from her former physician:

C——, West Virginia, May 21, 1904.

Dear Doctor Goffe:

Your letter of inquiry received. The patient moved to a neighboring town last autumn. I saw her father a few weeks ago, and he told me she lost the baby. Her labor was long and tedious, so he informed me. They first called a young physician, and then an older one to consult, and he was opposed to instrumental procedures—preferred to let nature take its course, which resulted in the loss of the baby. The child was a boy and very large. The mother got along very well. Yours truly,

F. S. T.

The time that had elapsed since the operation might preclude this case from consideration under the topic we are discussing, but impregnation followed the treatment so promptly, especially as it had effected mobility in the immobile organs, that it seems legitimate to pronounce it a *propter hoc*. If this be granted it shows the importance of retaining the patient under observation and treatment after operative procedures long enough to insure as perfect a recovery as possible, not only in general health and strength, but also in the local condition. The conditions that interfere with pregnancy are sometimes so trifling that in cases operated upon for this special symptom too great care cannot be exercised in eliminating every possible complication that the conditions at operation may suggest as possible to arise.

It is so natural and so easy, when the patient has recovered from the immediate effects of the operation and gained sufficient strength to leave the surgeon's hands, to trust to nature to restore a natural and healthful condition that the temptation is strong to dismiss her with encouraging words and supreme confidence in nature's restorative powers. The following case emphasized the importance of attention to the details of convalescence, especially the local process of healing.

Case III.—Miss S., aged thirty-four years, a vigorous and athletic woman, was referred to me for backache and menorrhagia. Examination disclosed a large, firm, retroverted uterus, with enlarged, collapsed, tender right ovary. I advised curettage and vaginal section, to which she consented. Both the anterior and posterior vaginal sections were made, part of the right ovary was resected, the round ligaments were shortened to relieve the displacement. The density of the uterine fiber suggested a general sclerotic or fibroid condition of that organ, and such proved to be the case, although no tumors or foci could be differentiated. But the case proved very hemorrhagic; an unusual amount of hemorrhage attended the curettage and also the vaginal sections, a steady, constant, uncontrollable oozing attended

every step of the procedure, coming more especially from the right side. When the operation had reached that stage when the anterior vaginal incision was about to be closed the hemorrhage continued so persistently that it seemed wise to apply a compression forceps to the right uterine artery close to the cervix. This was done, and was so successful in controlling the oozing that it was allowed to remain in place. The operation was therefore completed with the forceps in position, dressings were applied, and the forceps allowed to remain for thirty-six hours. Dressings were gradually removed, in accordance with my custom, and convalescence went on smoothly, with the exception of constant pain and tenderness at the point of application of the forceps. This continued even into the third and fourth week, although the tampon treatment was begun upon the fourteenth day. As this was not successful, a piece of gauze, to which a string was attached, was saturated with Churchill's compound tincture of iodin and placed in the vagina directly over the seat of pain, namely, to the right of the cervix in the fornix of the vagina, and held in that position by several cotton balls for twenty-four hours. This formed a very marked blister, taking off the vaginal mucous membrane for a space larger than a silver dollar; but the relief was almost instantaneous, and although the vagina remained sore for a week, the deep-seated pain was relieved and did not return.

The compression of the uterine artery, although done to meet an emergency, was in the line of treatment suggested and employed by many for the relief of bloody fibroids of the uterus, and in this case was successful in reducing the menstrual discharge to a normal amount. The tamponade treatment was continued for several weeks longer to keep the circulation at its highest pitch, and thus hasten the restoration of the compressed tissues to their normal condition as well as to avoid any excessive exudate or formation of adhesions.

The cases cited are simply typical of certain forms of possible postoperative complications of such a character as, if disregarded, would necessitate a secondary operation if an ideal result is aimed at. We know that complications arise, and we know that these complications are simply typical of conditions that we frequently meet with in chronic office patients who are symptomatically relieved by local treatment. The idea of prophylaxis and the freedom from these annoying complications that have characterized my work since applying this postoperative local treatment have encouraged me to believe that more perfect results in all details can be accomplished by this line of procedure.

DISCUSSION ON THE PAPERS OF DRS. FORD, MANTON, COE AND GOFFE.

Dr. Hiram N. Vineberg.—I think the point determining the value between local treatment and operative treatment can be settled when we consider the time the disease has existed. If we take the acute conditions, and those are the ones that are amenable to local treatment, it is my conviction that many of the cases we meet with in our practice operative intervention can be averted if we follow them properly. In the discussion this morning it was stated that the parturient woman should be observed for not longer than two weeks after delivery. I do not think that is a sufficient time to observe a case after confinement, and in my opinion a woman should be observed for at least six or eight weeks. In the first place, involution cannot properly take place before then; it is incomplete before four or five weeks have elapsed, and if it is not progressing satisfactorily and the patient be subjected to proper treatment, involution can be readily accomplished. On the other hand, if subinvolution be allowed to go on for a year or longer, during which time a chronic mastitis usually develops, I do not think any method of local treatment will afford relief, surgical or otherwise. If our operative results were always ideal, there can be no question but that some operative measure would be the quickest

and most definite; but we know, if we are honest with ourselves, we meet with many cases of exudates in which we have done an aseptic operation; everything has gone on smoothly, and yet in the second or third week there will be exudates. These exudates, as a rule, will become absorbed. Why? Because the condition is an acute one, recent, and treatment under these conditions will effect a cure. So I think in these conditions of the appendages, even considering gonorrheal infection, it is unjustifiable to operate until we have subjected the patient to local treatment for two or three months. But after a long time has elapsed following the primary attack, if we get acute attacks repeatedly, I do not believe local treatment will effect a cure.

I must say I am rather going back to the method of doing different operations upon the pelvic floor or several operations upon it at different séances. I think we get better results if we do not attempt to do too much at one operation.

In the case of laceration of the cervix, with large cystocele and rectocele, I have been satisfied with simply repairing the anterior vaginal wall and cervix at one operation, leaving the perineum for a second operation, and I have obtained better results by so doing.

Dr. Bache McE. Emmet.—I was gratified to hear the papers on this subject, and it seems to me they voice the feelings and methods of action of a large number of the Fellows. I think we must hold that a preparatory treatment must prevail, and that better results will always be obtained by so doing. I have seen many women who were operated on too early in view of the quick beneficial results that are supposed to follow, but in whom the same symptoms persisted after the operations were performed. These patients should go through a period of what might be called preparatory treatment, and the papers of Drs. Ford, Manton, and Coe are directed along the right line. The general system of the patient must receive attention. There is no organ but what bears on the general health, and affects these local conditions very materially. Undoubtedly, the person who is taught to breathe properly and to use the muscles of the chest has good blood coursing through the pelvis as well as other parts of the body. Regularity in the movement of the bowels is important to bear in mind in the consideration of

these cases. There is usually a fulness in the pelvis calling for depletion. These patients should be taught how to use the abdominal and perineal muscles to relieve flabbiness, to remove weight and sense of pressure, so that they will be in a far better condition to undergo any operative work that may be needed. Some of these patients, when they are taught systematic exercise, massage, calisthenics, have been able to pass through a period of comfort without any operations. I have seen good results sometimes follow such a course. I have used galvanism in some cases to make an impression upon the pelvic adhesions, the result being marked improvement in the circulation and disappearance of some of the symptoms.

Dr. Seth C. Gordon.—At the last meeting of the Gynecological Society in Boston I read a paper upon this subject, rather protesting against long-continued preparatory treatment for operations. I think the sentiment of the profession to-day is in accord with the idea that the keeping of a patient in a hospital or under observation in private practice for a month or two, applying hot douches and tampons, is really unwarrantable, and it is based entirely upon a wrong pathology, in my opinion. We talk about chronic inflammation. Emmet said, and Peaslee said a long time before him, that there is no such thing as chronic inflammation. What we call chronic inflammation is simply a condition of things consequent upon the product of inflammation, a chronic passive congestion, and a chronic passive congestion in organs that are hyperplastic, like the uterus, can be relieved so much quicker by an operation which cuts those vessels that are enlarged and lets out the blood, and then the patient begins to get into a good condition. Those who have operated for hyperplasia of the uterus, taking out a wedge-shaped piece from each side of the cervix, have noticed within a month that a uterus which measured five inches on the inside has diminished to four inches. Certainly, we relieve the chronic passive congestion by the operation. We relieve the acute congestion, which is more or less induced by the operation that is made upon the chronic condition. I believe, also, in many cases of acute salpingitis, where pus has formed and you have let it out, by following it up with hot douches, boroglycerid packs, etc., you can effect a cure which would ultimately have required abdominal section under the old plan. I think we

can accomplish a great deal in the acute cases after the immediate attack is relieved by local treatment. The old idea of hot douches, so much inculcated in the old times, has become a mania with many women. You will find them all over the country, all over the world, using hot douches. It is a relic of that time when so much of this preparatory treatment was used, and I stop it wherever I find it. It keeps up a state of congestion of the vagina, and does more harm than good. I believe that in the acute cases great benefit is derived from local treatment, especially after operation; but that cases of hyperplasia of the uterus cannot be relieved by any such treatment, and we must first cut the vessels, let the parts bleed freely, and then bring them together.

Dr. Hermann J. Boldt.—I feel that if there is no place for local treatment in gynecology, gynecologists had better relegate themselves to the line of surgeons and call themselves surgeons only. I believe that both sides have gone to extremes; that those who propose to treat gynecologic disorders only by surgery have gone to extremes, and those who propose to treat these disorders by local treatment alone have gone to extremes. I am confident that those of us who observe our patients carefully realize that there is a place for local treatment, for general treatment, as well as for surgical treatment. No gynecologist for a moment would consider treating a woman locally who has an ovarian cystoma or myofibroma of the uterus in which an operation is indicated. On the other hand, there are so many disorders for which operations are advised, not so much by the expert and competent gynecologist as they are by other members of the profession, that are not necessary. These operations are performed by general practitioners who are anxious to operate. Time and again such patients have come to us after operations have been advised when there was no reason for it, and in a number of such instances operations have been arranged for when there was no more need of operating than there would be for me to be operated on at this moment. I think we have a place for strict gynecologic work, and it seems to me if we were to teach those who are not fully equipped to deal with such conditions, where operations are not indicated, we would have a larger field than we now have for the treatment of other conditions.

Dr. Andrew F. Currier.—There is no doubt in my mind that a germ of truth, if nothing more, was in the minds of those pioneers in our department of medicine. The conditions in the great majority of patients who subject themselves to gynecologic treatment now differ from those which obtained when they presented themselves to gynecologists a generation ago. Most of them were the victims of bad obstetrics; many of them had exudates in their pelves, and the ideas of treatment in regard to such conditions at that time were vague at the best. It is not strange, therefore, that men like Peaslee and Emmet should have suggested the methods which they did, namely, long preparation for operations and careful regulation of the condition of the individual for what might be a very serious operation—an operation which would seem to us, in the light of our experience, to be of no great magnitude. I am speaking now of plastic operations on the pelvic organs. It would therefore seem that we can fairly take a different attitude in regard to these things now from that held by our predecessors. The principle, however, must be borne in mind that if we have a patient in an inferior physical condition, the wise thing is to have her undergo some sort of hygienic preparation before subjecting her to an operation, whatever the nature of it may be.

I think there is more to be said on the subject of postoperative treatment than most of us realize. Those of us who observe our cases carefully know that after some abdominal operations there follows a condition which leaves the patient as uncomfortable as she was before, and digital examination reveals a condition which would seem to be almost the same as before operation, that is to say, there is an exudate, there is a mass, there is sensitiveness present, and such cases as that can surely be relieved by some form of postoperative treatment. But I do not think, as a matter of routine, we would be justified in adopting these measures—in fact, it would be a confession on our part that the operative measures which we proposed had been insufficient and unsatisfactory.

Dr. Ford.—I have only a few words to say. My paper was intended to interest the members of this specialty in treating those disorders which are not yet surgical; in other words, prevention in the early treatment of simple disorders which I think can be accomplished with greater satisfaction by skilled men

than by those who have not given this subject the consideration that it deserves.

I want to say a word or two in regard to the position taken by Dr. Coe, which I thoroughly indorse. I have lived long enough to have done my share of operative work, preceding it with a long preparation with hot water, tampons, etc., which I regard as tommy-rot. It seems to me, if we are going to do an operation, we should be very particular with the preparation about the vagina and pelvis, the same as we would be about the abdomen, and then operate carefully. If this is done, a long preparatory treatment is unnecessary, and the sooner a woman is operated upon after she has made up her mind to have an operation done, the better it is for her.

Dr. Manton.—If the opinion should go out from this Society that there is no value whatever in the non-operative treatment of the pelvic diseases of women, God help the women of this country. In my part of the country everything that is operable is operated on by some men. Every small lesion of the cervix, every case of mild endometritis, every prolapsed ovary, every dislocated uterus—everything that is operable is attacked. I am sure that there is not a single Fellow of this Society but frequently has cases under his care that have been operated upon by poorly equipped surgeons, and where more harm than good has resulted. The main point in my paper was that of honest diagnosis. There are operable cases and cases that can be cured without operation.

Dr. Goffe.—I want to thank Drs. Vineberg, Gordon, and Currier for emphasizing the fact that local treatment meets its best indication and accomplishes the best results in acute conditions. After operation there is danger of these acute conditions, and, therefore, the treatment is logically indicated as a prophylactic.

In regard to the hot douche mania, referred to by Dr. Gordon, I do not quite agree with him. I do not stop hot douches, but instruct my patients *how* they are to be taken. The bad results of hot douches are due to the fact that they are not properly used. One woman uses a small douche bag that holds one or two quarts; she does not have the water at the right temperature, and it produces congestion. The point should be emphasized constantly that a large quantity of water is a necessity.

For instance, the douche bag should contain a gallon ; in urgent cases it should be refilled two or three times ; the virtue is in the heat, but it must be continued for a long time in order to get results. A short warm douche for cleanliness and a long-continued hot douche for congestion always give good results, and neither does any harm, if not repeated at too frequent intervals.

BATHING DURING THE MENSTRUAL PERIOD.

By J. Clifton Edgar, M.D.,
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In my practice for some years past I have found myself compelled to test the value of the traditional belief, of both profession and laity, that it is advisable to omit bathing during the menstrual period.

The avoidance of bathing during this time has come down to us from Biblical times, and in the Mosaic code of hygiene in the Old Testament will be found very definite rules upon that practice; but it would appear from the inquiries that I have made as a basis for the present paper that very hazy notions exist upon the subject not only among Christian physicians, but also among those who consider themselves Orthodox Hebrews in belief and practice. Customs among primitive people in regard to the bath during the menstrual period are much the same as those generally in vogue among the women of our civilization. As a rule, the full bath is customary and required by religious law *after* the period; among some peoples upon the cessation of the flow; among others not until the termination of the period of menstrual uncleanliness, which is usually about twice the number of days of the bloody flow. All primitive people have in their religious teaching the belief of uncleanliness during the flow, and this to an extreme degree, necessitating isolation, and forbidding all contact with their fellows, thus causing an enforced rest.

Somewhat less strictly is the isolation observed during the period of partial uncleanliness for four or five days more,

and this last period is terminated by the bath. Sometimes this bath is customary when the flow ceases at the end of the period proper. The Talmud orders the Jews to wash when the flow ceases, and not until thoroughly cleansed is the dip or full bath permitted. Among some of the African tribes the bath is not taken until the tenth day, after five days of complete and five of partial uncleanliness. Special attention should be directed to the custom of the Hindoos and Jews, who demand a cleansing by washing in warm water before the bath, thus securing a more thorough purification.

In the consideration of this subject several questions suggest themselves to us, namely:

1. The advisability of bathing of any description during the menstrual period and, if at all, to what extent?

2. The use of the bath in dysmenorrhea.

3. The use of Nauheim or other chemical baths or hydriatic procedures.

4. The risk of infection of the endometrium in intramenstrual tub bathing.

5. The influence of modern athletics on women lessening the risk, if any, of intramenstrual bathing.

These questions in the form of a circular letter I have submitted to the members of the American Gynecological Society, the New York Clinical Society, the New York Obstetrical Society, and others, from whom one hundred and twenty-two acknowledgments have been received. The superintendents of four of the largest training schools for nurses in New York City have also been questioned upon the subject, as well as the resident trained nurse or medical officer of several colleges for women.

It may be well at this point to state that my definition of a *cold bath* is one with a temperature of 75° or under; a *temperate bath* of 75° to 85°; a *tepid bath* of 85° to 92°, and a *warm* or *hot bath* of 90° to 105°.

1. THE ADVISABILITY OF BATHING OF ANY DESCRIPTION DURING THE MENSTRUAL PERIOD AND, IF AT ALL, TO WHAT EXTENT.

During the past ten years certain physicians, both in this country and abroad, but especially on the Continent of Europe, have come out in favor of bathing during menstruation, and the present study and inquiry has been undertaken in order, if possible, that we may formulate some safe conclusions, and to obtain the opinion prevalent among the physicians throughout this country upon the subject. That many contradictory statements exist is clearly shown in the following half-dozen abstracts taken from foreign literature and from answers to my circular.

Schauta,[1] of Vienna, advises against both warm and cold baths, he claiming that the former promote while the latter suppress the hemorrhage.

Kisch[2] states that as a general rule bathing during menstruation should be forbidden. Exceptions are to be made, however, in special cases only in which scanty menstruation may be treated by carbonic acid baths, which bring about an increase of the physiologic congestion of the ovaries.

Glax, J.,[3] writing in 1900, states that bathing of any sort is never justifiable during menstruation, but admits that the simple warm bath *may* be harmless.

Fehling,[4] in his work on gynecology, states that cold baths during menstruation are dangerous, by causing suppression and unpleasant congestive disturbances. Warm baths may sometimes produce a similar result, and when there is a tendency to hemorrhage they may increase the hemorrhage. Lukewarm baths need only be discontinued during the time

[1] Lehrbuch d. ges. Gynäkol., 1896, p. 106.

[2] Radecuren bei weiblichin sexualerki, Encyclopädie d. Geb. u. Gynäk., p. 100.

[3] Lehrbuch d. Balneotherapie, 1900, ii., p. 284

[4] Lehrbuch d. Frauenkrank., 1900, p. 143.

of maximum hemorrhage. After the discharge has become a mere bloody mucus bathing may be resumed.

Grenell,[1] writing in 1891, stood for the permission of bathing throughout the entire course of menstruation, provided it was applied according to correct hydriatic principles. He had never seen the slightest physiologic disturbance resulting.

Winternitz,[2] writing in 1890, permitted general bathing and hydriatic procedures up to the beginning of the menstrual period, but after the latter had begun they could be continued only when the indication was urgent, as in typhoid fever. Winternitz had never seen any real disadvantage follow bathing during menstruation. Exceptionally cessation of bleeding, backache, and uterine and ovarian colic were observed.

Honzell, G.,[3] in 1895, published his investigations concerning 123 fisherwomen. He found that the wading in ice-water was often accompanied by normal painless menstruation, provided that the women had become accustomed to it, and that sea baths among these people could be taken from puberty to the menopause without ill results.

An analysis of the one hundred and twenty-two answers received to this question reveals the fact that no less than one hundred and thirteen correspondents either advise or sanction some form of bathing during the menstrual period. In a few instances this is limited to the last day of the period, or is restricted to mere cleansing of the vulva when the napkins are changed, etc. In the vast majority of cases bathing means actual baths in some form during the menstrual period. A few who favor bathing, *per se*, omit it on the first day or so of the period.

[1] Ueber die Wassercur wahrend der Menstruations-periode, Uebersetzt von Spoerl-Gamma, Erlangen, 1891.

[2] Die Hydrotherapie auf physiol. v. klin. Grundlage, 1890, i., p. 493.

[3] On the Influence of Sea Baths on Menstruation. Ann. de Gynecol. et d'Obstet., 1894, No. 12.

But nine of the correspondents put themselves on record as opposed to bathing under any ordinary circumstances.

In regard to the character of the bathing sixty-three, or over one-half, permit only local baths, this term comprising ordinary sponging of the surface. Within these limits we find every shade of opinion. Some permit only such bathing as is concerned with cleanliness proper, as face, hands, feet, genitals, armpits, etc. The majority, however, seem to mean an ordinary sponge bath as distinguished from a tub bath. This class of sixty-three cases may, therefore, be understood to mean anything short of a tub bath.

Thirty-three correspondents sanction, in addition to local sponging, the use of the tub.

In regard to the temperature of the water a large majority of reporters—eighty-seven—specify that only warm or lukewarm (a few speak of hot) water is to be used, whether the bath be local or full.

In eighteen replies cool or cold water is sanctioned if the woman is accustomed thereto, and in twelve others the use of any form of bath to which the woman is addicted, or for which she had a natural preference, is sanctioned. This means that thirty correspondents see no objection in a woman having a cool or cold bath, provided she was used to it and derived no ill consequences.

In regard to the time for bathing it is natural that the great majority recommend the same course throughout the period (seventy-six reports). A small number (twenty-five), while recommending bathing as a general proposition, seem to qualify this by the statement that the end rather than the beginning is the preferred time. In other words, they seem to deem it wise to refrain from bathing during the first day or two of the flow. The very few (three) who recommend bathing at the beginning rather than the end of the period were probably thinking of therapeutic baths for dysmenorrhea.

2. THE USE OF BATHS IN DYSMENORRHEA.

In regard to special *hydriatic procedures* or therapeutic baths for *dysmenorrhea* we find that seventy-six correspondents recommend them. In the great majority the hot sitz or foot bath was recommended. A few mention hot full baths, and in a particular class of cases these baths are advised just before and during the onset of the flow. Some would use the hot bath until a free flow is established and pain ceases. The remainder—about one-third of the correspondents—apparently see no efficacy in baths for dysmenorrhea.

3. THE USE OF NAUHEIM OR OTHER CHEMICAL BATHS OR HYDRIATIC PROCEDURES DURING MENSTRUATION.

Makawejeir, J.,[1] reported that twenty-six women with normal genitals and normal menstruation suffered no ill results from the mineral baths of Staraza Ruska (85.4° F.) (28° R.), the menstruation being unaffected, while in thirty-one women with abnormal menstruation not dependent apparently upon structural disease, the action of bathing upon the menstrual function was distinctly favorable.

Keller, H.,[2] 1897, has frequently noticed in the course of simple warm brine baths that menstruation went on as usual. Nevertheless, he advised that treatment should be omitted for from three to five days corresponding to the period, in order that the mental and bodily exhaustion or irritability be not augmented, and no opportunity furnished for catching cold.

Loebel,[3] 1896, states that moor baths (mud baths) may be continued during menstruation when strictly indicated, and

[1] Mineralbader zur Zeiten und pathologischen Menstruation. Zeitschrift f. Geburts. u. Gynäkol., xxv. p. 77.

[2] Die Menstruation und Bedeutung f. Curproceduren. 18 Versamml. d. balneol. Gesell., 1897.

[3] Die Menstruation in der Balneotherapie. 19 Versamml. d. balneol. Gesell., 1896.

that they may even then exert a favorable influence upon gynecologic affections.

Dr. Richard Fischel,[1] 1903, in a review of these citations and the literature of the subject, claims that the problem has never been submitted to a special and exact clinical investigation. He therefore determined to test in this respect thermically indifferent fresh water baths, and brine baths with addition of iodins, upon the prostitute material of his clinic. All servant girls and prostitutes with venereal disease who were found to be free from gynecologic affections, and at most had only a history of slight dysmenorrhea, were subjected to the test. Although the material was very large, a relatively small number were suitable for the experiment. Other women patients could not be controlled for these tests. In a first series of twelve cases the patients took general baths of aqueduct water at 64.1°, 88.5° F. (21°, 29° R.). In the second of twelve cases the iodid baths were used, from 100 to 125 grains of salt being added to each bath. The baths were given at 7 A.M. and 11 A.M., respectively, and the girls were then put to bed to prevent catching cold. The management also differed from that used in ordinary routine in other respects. Thus these patients were not permitted to leave their rooms during the hospital sojourn treatment.

Of the first series but two of the twelve cases showed any influence upon menstruation. These two appeared to show a shortening of the period as compared with previous menstruation. The differences, however, were slight, and may have been due to errors of computation. In a few cases slight bearing-down pains in the abdomen were mentioned. Actual suffering, however, was absent. In three cases the period seemed to come on ahead of time, and in one case it was retarded. Tampons were used and were weighed in all

[1] The Thermically Indifferent Bath during Menstruation, with Special Reference to the Iodin Salt Baths of Bad Haller. Prague med. Wochen., May 7, 1903.

cases, and in but one was evidence thus obtained that an increase of hemorrhage had occurred.

In the second series of cases (iodized brine baths) one woman had her menses cease during the first day of the period. The baths were continued, however, and menstruation ceased on the third day, if the girl's word could be taken that she always menstruated five days. In both these cases the baths were begun during menstruation, but in two other cases in which the first bath was taken in the midst of menstruation no such result was obtained. In one case of the second series the menses were retarded. In another, after apparent normal cessation of menses, a slight secondary hemorrhage supervened two days later, the baths having been continued.

In two cases the dysmenorrhea was entirely relieved, once by sitz and once by full baths.

Generally speaking, no bad results were noticed in either series. In one case in Series I. the patient was tested again two years after her first baths without any bad results. During the interval she had been quite free from menstrual disturbances.

Fischel's conclusion from these experiments is that scruples against bathing during menstruation are not borne out by facts.

The answers received in my circular to this question seem to show that the query in regard to Nauheim or mineral baths was evidently not fully comprehened by many reporters, and but fifty-five definite answers were received. Of this number thirty thought that the baths were contraindicated during the menses, while the other twenty-five gave chiefly a qualified assent, *i. e.*, if the conditions of temperature, duration, habits, etc., were favorable, the baths might be permitted. Several state that in typhoid fever no account is taken of menstruation when hydriatic measures are considered necessary.

A physician in active practice at the Hot Springs of

Arkansas writes me "that baths during the *entire* menstrual period are not contraindicated in certain well-chosen cases, but, on the contrary, are beneficial."

A physician at the Mount Clemens Hot Sulphur Baths of Michigan states in answer to my questions that "he allows any rheumatic patient with normal menstruation to take the sulphur baths regardless of menstruation."

For several years past I have permitted patients to continue through the menstrual period the carbonate iron baths of St. Moritz, with the clear understanding that there shall be no chilling of the surface after the baths.

4. THE RISK OF INFECTION OF THE ENDOMETRIUM IN INTRAMENSTRUAL BATHING.

The experiments of Winternitz appear to prove that the water in an ordinary tub bath does not enter the normal vagina. His experiments consisted in the use of color reagents, such as iodin and starch. A tampon soaked with a starch solution was packed into the upper part of the vagina, and the bath water was impregnated with iodin. In none of his experiments could a positive reaction be obtained. On the other hand, the experiments of Sticker[1] and Strogan[2] prove beyond question that in the latter part of pregnancy of both primigravidæ and multigravidæ water from an ordinary tub bath readily penetrates as far as the cervical canal. But one can readily understand how this could happen when the shortening of the vagina and gaping of the vulva in the last days of pregnancy are taken into account. At the present we have no experimental proof that water penetrates the cervical canal in intramenstrual tub bathing.

In regard to the risk of infection from tub bathing seventy-five reporters to my circular could see no danger save under

[1] Centralbl. f. Gynäkologie, March 2, 1901.
[2] Ibid., February 9. 1901.

some unusual conditions, as when polluted water was used. There were thirty-three reports which admitted the presence of a certain risk. No one seemed to know of any special cases.

In other words, about three-fifths feel safe to state offhand that there is no danger, or, at most, only a nominal one. The other two-fifths do not recognize any great danger, but are not quite satisfied to say so without some qualification, as, for example, that there is some possibility of a congestion of the pelvic viscera starting up a latent infection, and that there is also some risk from dirty water, sponges, wash-cloths, etc.

I firmly believe that there is a distinct risk of infection of the uterus in both intrapartum and intramenstrual tub bathing. Some cases of early puerperal infection in primiparæ who have not even been digitally examined can be explained on no other grounds, and many cases of pelvic inflammation, of salpingitis, and pelvic adhesions in young girls would seem to depend upon no other source of infection.

The risk, if any, of uterine infection during intramenstrual tub bathing can be avoided by the substitution of the shower for the tub bath until after the active hemorrhage has ceased, indicating the regeneration of the menstrual deciduus.

5. THE INFLUENCE OF MODERN ATHLETICS ON WOMEN LESSENING THE RISK, IF ANY, OF INTRAMENSTRUAL BATHING.

As far as my study and inquiries have gone I can find no evidence to show that the influence of modern athletics on women lessens the danger of intramenstrual bathing directly, although there seems no doubt but that it does indirectly by strengthening the system and making the individual more robust and less easily affected by conditions which would certainly prove injurious to the more sensitive and feeble.

In regard to athletics, sixty-five reporters to my circular thought they enabled a woman to bathe during the menses

with more immunity; in nearly every case the benefit conferred was indirect. Twenty-three other reporters saw no connection whatever between athletics and immunity to bad effects of bathing.

The advisability of at least the same frequency if not the same character of bathing during the menstrual period as at other times, on both hygienic and esthetic grounds, goes without the saying, and women who have accustomed themselves to daily bathing at this time suffer actual physical discomfort when for any reason the bathing is interdicted.

The excretory functions of the cutaneous glands, but especially of the axillæ and vulva, are exaggerated during menstruation, giving out in not a few women, offensive odors which common decency, if not hygiene, demands shall be corrected by frequent bathing and not by perfumes and deodorizing powders.

Can we say to the patient who appeals to her physician for some rescue from the prejudices and traditions of her mother and grandmother, that she can safely continue through her menstrual period her custom of bathing and personal cleanliness that has been her habit during the intermenstrual month? With certain limitations, yes. My belief is that with certain distinct exceptions all objections against bathing during menstruation emanate from tradition and popular fallacy, and can be answered along these grounds alone.

Further, the statement that the use of the bath at this time is all a matter of habit and can be acquired by gentle progressing, by gradual acquirement, is true in the majority of cases of healthy women, although it does not, of course, hold good for every woman. Menstruation promptly ceases in some individuals if only cool water is applied to the external genitals, with others even if cold water is applied to the body or face.

My inquiries show that nurses not infrequently suffer from not only dysmenorrhea, but acute suppression and pelvic

colic, while immersing their arms in cold water in the administering of cold (75° and under) baths and packs.

In my practice are two sisters, both married, both the mothers of several children, both apparently equally strong and healthy, and both with normal menstrual functions. The elder of the two has used tub baths (tepid) and salt water bathing regularly in Long Island Sound without any regard to her menstrual periods. The younger of the two has repeatedly attempted to do the same, on the advice of the elder, and each attempt has been followed by acute suppression, pelvic congestion, and ovarian colic.

In the past five years several cases of obstinate amenorrhea have come under my observation, caused by the attempt on the part of the patient to disprove the popular belief that surf bathing cannot be enjoyed with impunity during the menstrual period.

Again, the teaching that whatever the habit or custom of the woman in bathing during the intermenstrual month can be safely continued during menstruation is not to be blindly followed. My observation and inquiries would indicate that only a few who are accustomed to a daily morning "cold tub" can without inconvenience continue this during menstruation. But, on the other hand, I find that the daily routine as regards the "cold tub" can be returned to much earlier during the flow than is generally the custom, say on the second or third day. I find that many follow this custom, and only substitute the tepid sponge for the "cold tub" on the first and second day, and find no reason to regret it.

"Cold tubbing" throughout menstruation is the exception among American women. This I gather from my circular, and from the statements of superintendents of training schools for nurses and health officers of colleges for women.

The resident trained nurse for five years of one of the largest colleges for women, with seven or eight hundred students between the ages of seventeen and twenty, informs me that only a few of this number are accustomed to take

the "cold tub" during menstruation, and these were accustomed to do so from puberty. It was the custom of these girls to fill the tub with water as it ran from the cold water faucet, and, jumping into the water, to remain there one or two minutes. In these exceptional cases there was no disturbance of menstruation brought to the attention of the health officer or resident trained nurse of the college.

The superintendent of one training school for nurses informs me that many nurses on entering the school were not accustomed to use even a daily "tepid sponge" during menstruation, but that all were advised so to do, and soon acquired this habit in response to the demands of a more thorough personal cleanliness, and that a few omitted their customary "tub bath" only for the first or second day of the flow. Practically the same statement was made by the superintendent of two other training schools.

Another superintendent submitted the questions of the circular to twenty of the nurses in the school. All the twenty were in the habit of taking once or twice a day a full sponge bath; several took sitz baths in addition, and two had indulged in surf bathing during menstruation without attendant discomfort.

The superintendent of one training school writes me that she advises the pupil nurses to take a full sponge bath of fresh tepid water every morning of the menstrual flow, and considers that by so doing no risks are run. At the same time, she states, she does not consider this method of bathing sufficient in all cases for personal cleanliness, but still she does not dare advise the tub or shower.

My belief is that the woman of ordinary strength and health is able to bathe during menstruation, following certain simple precautions, not only without any injury but with marked addition to her personal comfort and benefit to her general health.

I have never known anyone injured by the practice as advised, and I feel sure it can be followed with safety.

Although I believe in the risk of infection of the uterus in tub bathing, still the great harm obtained is by chilling of the surface in improperly applied baths.

For some years past I have been advising bathing at this time under certain limitations, and although I have experienced some very "unpleasant quarters of an hour" with the mothers and even grandmothers of some of the patients, still I have had no reason to regret the practice.

My plan has been in cases in which no bathing had been the custom, and where prejudice was strong, to advise the "tepid sponge bath" once or twice daily during every day of the flow for one or two menstrual periods, at the same time insisting that the temperature of the bath-room shall be such as to avoid the possibility of an after-chilling of the surface; also, that the sponging shall be rapid, a small portion of the body at a time, followed by rapid drying, and the whole procedure carried only to the extent necessary for cleanliness. At the next or second succeeding period a tepid shower or tepid bath is allowed after the flow is well established, say on the second or third day, always with the same precaution against chilling of the surface and only to the extent necessary for cleanliness. This plan is then thereafter adhered to.

Women accustomed to a daily morning cold tub or shower during the intermenstrual period are permitted to gradually and cautiously continue the practice during menstruation, beginning its use on the last day of one menstrual period and using it one day earlier each successive flow until the third or second day is reached.

The cold shower or tub on the first and second days I am accustomed to forbid, substituting the tepid sponge, although I know of instances of the first plan where apparently no harm results. Thus by a gradual progression, by gentle changes, avoiding any *sudden* change in the custom of the individual, the habit of bathing during menstruation can be acquired with safety.

Surf bathing I would make an exception in all cases, and prohibit it on account of the exposure with its attendant dangers of surface chilling.

CONCLUSIONS.

1. All forms of bathing during the menstrual period are largely a matter of habit, and usually can be acquired by cautious and gentle progression, but not for every woman does this hold good, and surf bathing where the body surface remains chilled for some time should always be excepted.

2. A daily tepid sponge bath (85° to 92°) during the menstrual period is not only a harmless proceeding, but is demanded by the rules of hygiene.

3. In the majority, if not in all women, tepid (85° to 92°) sponge bathing after the establishment of the menstrual flow, namely, second or third day, is a perfectly safe practice.

4. Further, in most women the habit of using the tepid shower or tub bath after the first day or two of the flow can with safety be acquired.

DISCUSSION.

DR. J. RIDDLE GOFFE.—This is a subject in which I have taken great interest from the beginning of my practice. Cautiously, to patients who would receive advice kindly, I have advised constant bathing during the menstrual period in the following way: If girls or women were in the habit of taking a regular tub bath every morning, either hot or cold, I have inculcated the idea that it was wise to continue these through the menstrual period, and I have been able to induce a large number of women to adopt that practice. I see no reason why the habit of life should be changed in regard to bathing because the menstrual period has come. While I have kept no accurate record of the number of women who have adopted my suggestion, I have yet to report any unpleasant experience from so

doing, and I know a great many have followed it. I have also instructed women who have children to adopt that practice with their daughters, saying that their girls ought to continue it even when puberty arrives and after menstruation has become established. It has always seemed to me that if there is any time in a woman's life when she needs to be cleanly it is when she is menstruating, as we know at that time the glands of the skin, especially of the axillæ and the groins, are very greatly stimulated. They excrete probably at that time more nitrogenous detritus from the wear and tear of the body than at any other time, and there is an unpleasant odor about most women. I see no reason why a woman should cover herself with perfume and carry attar of roses in her underclothes during that period any more than we should cover up infection by deodorizers. A woman can make herself by frequent baths just as sweet and agreeable during that period as she is ordinarily, and I believe it is the proper method to pursue.

In regard to dysmenorrhea, I have obtained most satisfactory results from hot tub baths. I use the hot tub bath constantly in such cases; in fact, I advise that treatment more than any other for the relief of dysmenorrhea. It is perfectly rational. The pain is due to congestion, abnormal congestion, and if we can equalize the circulation of the body at that time we relieve the congestion and allow the function to establish itself. I instruct the patient to take a hot tub bath and remain in it for a sufficient length of time to start a good perspiration. Then she is put to bed, covered with blankets, allowed to perspire for twenty minutes, and then the covers are gradually removed. I have obtained very prompt and gratifying results from that method, and if menstruation does not establish itself, I have the bath repeated. I deem it preferable to giving drugs; it is more efficient than a sitz bath or foot bath, and I have yet to see unpleasant consequences following it.

Dr. William H. Baker.—I think the whole profession is indebted to Dr. Edgar for bringing this subject before us. It is, as he says, largely a matter of tradition and habit, and I am very glad in his conclusions that he sounds a note of warning in regard to the limitations of bathing during menstruation, for, as he says, it is the matter of habit which must be carefully considered.

Dr. Seth C. Gordon.—When questioned by women and girls as to whether they can go in bathing at the seashore during menstruation, I have invariably answered no—never under any circumstances.

If there is one thing that is valuable in relieving dysmenorrhea in the early stages, it is a hot bath, and I mean a bath as hot as the patient can tolerate it. I know of no one thing that has been so beneficial as that. As Dr. Goffe has said, it relieves internal congestion; it brings the blood to the surface. The patient should be instructed to lie in the hot water for ten minutes or more. What I like still better is to adopt the Swedish mode of giving a hot bath, that is, after the hot bath, let the hot water partly out and then turn the cold water faucet into it, thus cooling it off gradually. By so doing the skin is toned up better than if the patient is given a hot bath and then goes to bed. As a means of relief, it is very much superior to giving opiates or anything of that sort. I have found it invaluable in the cases of a certain class of girls and women. As to the remainder of the period, I always advise cleanliness about the axillæ, groins, vulva, and external parts with warm water.

Dr. Henry D. Fry.—I would like to ask Dr. Gordon whether this bath he mentioned produces a cure of the dysmenorrhea, or whether it is simply palliative, and is to be kept up every month?

Dr. Gordon.—It does not effect a cure, but affords great relief for the time being.

Dr. Beverly MacMonagle.—On the Pacific coast, when patients ask me if they can go in bathing during the menstrual period, I invariably tell them Yes. Dr. Gordon, I am sorry to learn, does not let them go in bathing in the Atlantic Ocean. The Pacific Ocean around San Francisco and Monterey Bay is colder than the Atlantic Ocean is during the summer months, and sometimes the temperature of the water will be as low as 54°, and some of the most healthy women I know are accustomed to bathe in that water right through the menstrual period. I was first struck with the impunity of bathing in the surf by observing the women in Honolulu. There the women of the Hawaiian Islands go into the surf every day all the year round, sometimes five or six times daily. If a woman feels hot and uncomfortable, she goes in and lies around in the water. The

water is much warmer than it is with us, and its temperature is more uniform. The bottom of the water and the beach are all beautifully white, and possibly they are more aseptic than our beaches are. I cannot say definitely as to that.

Another custom of the women of Hawaii is to go in bathing immediately after the delivery of the child. Many of them are delivered out in the open air, and right by the seaside, and after delivery they walk into the sea and bathe until the flow ceases, and they come out feeling entirely comfortable. One would naturally think that there were ulterior consequences about this custom, and that great harm would follow its practice. The Hawaiian women, as many of you know, are a fine-looking set of women.

In Japan the Japanese woman does not let any blood appear during the menstrual period. She takes a douche to a certain extent; she uses water to cleanse the vulva; she uses a small tamponade of Japanese paper and goes about her work. It is a well-established fact that the Japanese are a healthy people, and that they have got strength equal to the women of Russia, although Russia is governed very largely by the same conditions and traditions that we are.

Let us ask ourselves the question, Why is it more healthy to be unclean during menstruation than it is at other periods? The menstrual flow becomes infected after it leaves the body, doubtless, but during the time it is in the vagina the peculiar secretion of the vagina renders it aseptic. The fact that aseptic water enters the vagina certainly can produce no effect on that secretion, and if we have, as it is claimed, an aseptic region about the cervix and in the cervix, we have the parts perfectly protected from anything that may enter the vagina in bathing, except infection of some kind, and that can easily occur from a soiled napkin as well as from a bath or bathing. Some women do not wear napkins during menstruation, and by so doing they avoid infection which comes from them. There are many sources of infection, and it is my opinion that a woman is no more exposed to infection by taking her bath in the surf and in a good clean tub and taking an aseptic douche, if necessary, during menstruation, than she is in going about her daily occupation, or than she is by exposing herself to infected pads or napkins from time to time.

Dr. Edgar.—This matter of bathing during menstruation was brought to my attention about two years ago, at which time I received many inquiries from patients demanding some relief and departure from the usual custom, and the question arose from the standpoint of athletics more particularly. For instance, a woman who was playing golf, demanded more general cleanliness than had been her custom or than she had been taught to observe. I took the stand then that bathing, with ordinary precautions, could be carried out. I am free to confess that I was subjected to severe criticism from more than one family. There were several daughters in one family on Long Island who were particularly interested in athletics, and it was after this criticism very largely that I prepared this circular letter and sent it to the Fellows of the Society a year ago. I had a definite idea regarding the matter at the time, and the answers received were practically corroborative of my belief, namely, that it was a harmless procedure along certain lines with certain limitations.

There is a difference of opinion regarding salt-water bathing. I have a number of patients who bathe in the waters of Long Island Sound with comparative impunity. I have patients along the Jersey coast who bathe with impunity during menstruation; and yet some of my patients have trouble from suppression or dysmenorrhea if they indulge in surf bathing. As I said in my paper, every woman has her personal equation; she is a law unto herself. I referred to two sisters, one of whom pays no attention to menstruation as regards bathing. For years she has bathed regularly on the north shore of Long Island Sound. It is still water, while the other sister has been seriously ill a number of times by following her example. Both are in apparently perfect health.

Regarding infection, I do not think there is much risk in sea bathing. However, I fully believe that there is a certain risk, which has been proved, in pregnancy; water can enter the cervix. The woman can have a raw cervix during menstruation, or a wound, and that being the case, there is a possibility of infection from that source, and so long as there is a possibility I believe she should avoid it, if possible.

THE NATURE OF THE INDICATIONS FOR OPERATION FOR FIBROID TUMORS OF THE UTERUS.

By Charles P. Noble, M.D.,
Philadelphia.

It is my desire to present one aspect of the general subject of fibroid tumors of the uterus. This is the nature of the indication for their removal. In 1901 I read a paper before the British Gynecological Society upon "The Complications and Degenerations of Fibroid Tumors of the Uterus as Bearing upon the Treatment of These Growths."[1] When I began the preparation of this paper I felt convinced that the classic teachings concerning the subject were very faulty, but I did not realize myself until my own material had been tabulated and analyzed how far these teachings are from representing the truth concerning these tumors.

Following my paper, Cullingworth,[2] Frederick,[3] and Scharlieb[4] have reported consecutive series of cases from

[1] British Gynec. Journ., 1901, vol. xvii., No. 67, p. 170; Amer. Journ. Obst., 1901, vol. xliv., No. 3, p. 289.

[2] An Analysis of 100 Cases of Uterine Fibromyoma, in which the Condition of the Tumors and the Complications to which they had Given Rise were Verified by Operation, Journ. Obstet. and Gynec., British Empire, 1902, vol. i.

[3] A Study of Uterine Fibromyomata, with Especial Reference to Their Degenerations and Complications as Furnishing Reasons for Early Operations, Amer. Gynec., 1902, vol. i. p. 255.

[4] An Analysis of 100 Cases of Fibromyomata Uteri, Journ. Obst. and Gynec., British Empire, 1902, vol. ii. p. 323.

their own practice, and Hunner[1] and McDonald[2] have reported two additional series of consecutive cases in which the patients were operated upon for fibroid tumors. My original paper has been followed by two others[3] reporting additional cases. In this way, at the present time, there are available, 983 cases of fibroid tumors from which an analysis may be made as to the nature of the degeneration and complications of these growths. In addition, we have a group of 205 cases (making 1188 in all) reported by Martin,[4] in 1888, in which he analyzes the degenerations in the tumors, but ignores the complications met in his series of cases.

The following table represents the facts which are now available for our consideration:

[1] One Hundred Consecutive Cases of Myoma of the Uterus, American Medicine, 1903, vol. vi., No. 2, p. 55–57.

[2] Complications and Degenerations of Uterine Fibromyomata, Journ. Amer. Med. Assoc., 1904, vol. xlii., No. 21, p. 1344.

[3] A Study of the Degenerations and Complications of Fibroid Tumors of the Uterus from the Standpoint of the Treatment of These Growths, American Gynec., April, 1903; The Treatment of Fibroid Tumors of the Uterus, Jour. Amer. Med. Assoc., 1904, vol. xlii., No. 21, p. 1350.

[4] Centralblatt für Gynäkologie, 1888, p. 389.

TABLE OF THE DEGENERATIONS AND COMPLICATIONS IN A SERIES OF 1188 CASES OF FIBROID TUMORS OPERATED UPON BY MARTIN, NOBLE, CULLINGWORTH, FREDERICK, SCHARLIEB, AND IN A SERIES REPORTED BY HUNNER AND BY MCDONALD.

	Cases.	Per cent
Carcinoma of the corpus uteri	29	2.4
Epithelioma of the cervix uteri	12	1
Epitheliomatous infiltration of fibroid tumor arising from adenocarcinoma of the corpus uteri by metaplasia	1	
Sarcoma	22	1.8
Chorioepithelioma	2	0.16
Myxomatous degeneration	41	3.7
Cystic degeneration of tumor	40	3.3
Edema of tumor	11	0.92
Calcareous infiltration of tumor	26	2.1
Necrosis of tumor[1]	67	5.6
Twisted pedicle, pedunculated tumor	3	0.25
Intraligamentous development of fibroid	34	2.9
Subvesical development of fibroid	2	0.16
Hyaline degeneration of tumor	69	5.8
Hyaline degeneration and calcareous infiltration	8	0.67
Adenomyoma	8	0.67
Hemorrhagic degeneration of tumor	10	0.84
Fatty degeneration of tumor	7	0.59
Procidentia uteri	5	0.42
Retroversio uteri	4	0.33
Pregnancy	1	
Ectopic pregnancy	3	0.25
Ectopic pregnancy, salpingitis, hydrosalpinx	1	
Dermoid cyst, bilateral; umbilical hernia	1	
Dermoid cyst; suppurating sinus through abdominal wall	1	
Dermoid cyst with twisted pedicle	1	
Dermoid cyst	2	0.16
Ovarian cyst	47	3.9
Ovarian cyst with twisted pedicle	2	0.16
Ovarian cyst, suppurating	1	
Ovarian cyst, bilateral	2	0.16

[1] Both Cullingworth and Scharlieb rejected cases of fibroid polyps removed per vaginam, on the ground that no one disputes that these tumors should be removed. Had they been included, the percentage of cases of necrosis would have been greater.

	Cases.	Per cent.
Ovarian cyst, unilateral	22	1.8
Cystic degeneration of ovaries	78	8.4
Calcification of ovary	1	
Ovarian fibroma	3	0.25
Ovarian carcinoma	2	0 16
Papillary carcinoma of both ovaries	1	
Hematoma of ovary	1	
Parovarian cyst	7	0.59
Broad ligament cyst	2	0.16
Abscess of ovary	1	
Abscess of ovary, single	5	0.42
Abscess of ovary, double	2	0.16
Tubo-ovarian abscess	2	0.16
Pyosalpinx	11	0.92
Pyosalpinx, bilateral	11	0.92
Pyosalpinx, unilateral	9	0.75
Pyosalpinx with tuboovarian abscess	2	0.16
Abscess of broad ligament	1	
Hematosalpinx	2	0.16
Hydrosalpinx	25	2.1
Hydrosalpinx, bilateral	15	1.2
Hydrosalpinx, unilateral	18	1.5
Hydrosalpinx and tubo-ovarian abscess	1	
Salpingitis	46	3.9
Salpingitis, bilateral	2	0.16
Salpingitis, unilateral	10	0.84
Salpingitis and hydrosalpinx	3	0.25
Salpingitis and tubo-ovarian abscess	3	0.25
Fibroma of Fallopian tube	1	
Papilloma of appendages	1	
Appendicitis	14	1.1
Ventral hernia	1	
Umbilical hernia	3	0.25
Carcinoma of umbilicus	1	
Tuberculous peritonitis	1	
Universal adhesions	4	0.33
Adhesions to viscera	6	0.5
Adhesions to tumor	5	0.42
Varicose veins of pelvis	4	0.33
Thrombosis of veins of lower extremities	2	0.16
Total	795	

Especial attention is called to the relative frequency of adenocarcinoma of the body of the uterus as compared with epithelioma of the cervix. In women not the subjects of fibroid tumor epithelioma of the cervix is about four times as frequent as adenocarcinoma of the corpus, therefore, for the 29 cases of carcinoma of the corpus uteri there should have been about 116 cases of epithelioma of the cervix, whereas there were but 12. So marked a divergence from the usual ratio is a striking fact, and makes the deduction a rational one that fibroid tumors exert such an influence upon the nutrition of the uterus as to predispose to the development of cancer of the corpus.

The foregoing series of complications and degenerations is presented as showing what was found in 1188 women operated upon for fibroid tumors. Naturally it is not claimed that many of the complications were caused by the presence of the fibroid tumors, but merely that they existed as complications.

It seems to me clear that a careful consideration of the facts presented in this table should convince anyone with an open mind that the classic teachings concerning fibroid tumors are erroneous. I need scarcely remind you that this teaching is that fibroid tumors of the uterus are benign growths which usually produce but few symptoms, and which, after the menopause, undergo retrogressive changes, becoming smaller or disappearing; that the chief danger of fibroid tumors consists in the fact that at times they cause hemorrhages from the uterus, and that rarely they cause trouble because of their size or because of pressure upon adjacent viscera.

How far this teaching comes from representing the facts contained in the foregoing table! An analysis of the 1188 cases contained in the foregoing table shows that because of the degenerations in the tumors about 16 per cent. of the women would have died without operation. About 18 per cent. would have died from the complications present.

In addition to this it is well known that a certain percentage would have died from intercurrent diseases brought about by the chronic anemia present in many of the cases and by injurious pressure from the tumors upon the alimentary canal and urinary organs; in other words, that at least a third of the women having fibroid tumors, as shown by the foregoing table, would have died had they not submitted to operation.

I need not remind the profession that the classic teaching concerning the disappearance of fibroid tumors after the menopause is largely erroneous. It is well known that many fibroid tumors grow more rapidly after the menopause than before it, and the analysis of the cases contained in these tables shows that fibroid tumors after the menopause are at least as liable to degenerations and complications as before it.

It is a classic statement that many women having fibroid tumors of the uterus live, and die from other causes, and remain in ignorance of the presence of the tumor. This is a statement which is not based upon evidence, and until such evidence shall be produced it is my opinion that it represents the truth in a very small minority of cases. Women having fibroid tumors, as a rule, are sick women, suffering either from the fibroid tumors themselves or from various complications which are so common in the general group of women having fibroid tumors. The fact, that of 1188 women suffering from fibroid tumors of the uterus, operated upon consecutively, 795 had the complicating conditions enumerated in the table is ample proof of the falsity of this teaching.

From all the facts now before us concerning the life history, the degenerations, and the complications of fibroid tumors, the following conclusions appear to me to be inevitable:

About 16 per cent. of the women having fibroid tumors would die if not operated on, because of the degenerations

and complications arising in the tumor or in the uterus; in other words, that women having fibroid tumors run a far greater risk of losing their lives by not having them operated on than by submitting themselves to operation. In addition, it has been shown that women having fibroid tumors, as they present themselves to the gynecologist, have, in addition to the tumor itself, many complications outside of the tumor and the uterus. Of the women having fibroid tumors who have come under my observation, about 18 per cent. would have died without operation, because of the complications outside of the tumor and the uterus.

This state of facts forms a secondary but an additional reason for operating on women having fibroid tumors. Taking them as a class, a certain percentage will die from intercurrent disease due to chronic anemia or to pressure upon the abdominal viscera. Taking them as a whole, at least a third of the women having fibroid tumors who have come under my observation would have died had they not been operated upon. I hold that the scientific position in reference to the indication for fibroid tumors is that as these facts are incontrovertible—being based on careful clinical and pathologic investigations—the indication for operation should be based on these facts, and not on any particular symptom which may be present at the time the woman comes under observation. My position is distinctly in opposition to that which may be called the classic or traditional position, which is that the operation to remove a fibroid tumor should be done because of the symptoms the tumor is producing at the time the patient presents herself for treatment—whether this be hemorrhage, or pain, or pressure on the urinary organs or on the alimentary canal, or whether it is a state of mind arising in the woman because of her knowledge of the existence of the tumor. Nothing is more variable than symptoms, which can frequently, and indeed usually, be removed by appropriate treatment. Indeed the state of the case is even worse than this, as for

most symptoms it is necessary to accept the patient's statement, because of the lack of other evidence. On the other hand, nothing is more definite than physical facts and pathologic findings. When the two positions are placed in opposition, it seems to me there can be no question as to which is the correct one and which should be accepted by the profession. To speak by analogy, a fibroid tumor should be removed for the same reason that an ovarian tumor should be removed; the indication varying in degree, but not in kind. Ovarian tumors are removed, irrespective of the symptoms they are producing, because of our knowledge of the life-history of these growths, which is that if left to pursue their usual development a fatal result will occur in almost all cases. Similarly, fibroid tumors should be removed because if left to pursue their usual development, in at least a third of the cases a fatal result will occur.

It is a general rule in surgery that a tumor when present in the body should be removed. This rule is as applicable to fibroid tumors of the uterus as to other tumors. It is my opinion that this rule will hold good in the future, and the exceptions to the rule will be based upon the facts in particular cases—the small size of the tumor, its subserous development, and the existence in the particular woman of complicating diseases which would render operation especially hazardous.

DISCUSSION.

Dr. J. Whitridge Williams.—In general, I agree with Dr. Noble that the majority of cases of myoma should be operated upon at an early stage, but I should not be willing to accept the statistics offered as giving the indications for so doing.

Take the first two points—carcinoma of the body of the uterus and epithelioma of the cervix. I consider that both of these conditions should be regarded as purely accidental complications and as having nothing to do with the myomatous

condition. Moreover, I believe that the general teaching that carcinoma of the cervix much more frequently than that of the body of the uterus, is due mostly to the fact that most of us do not systematically examine scrapings from the body of the uterus in large series of cases; and it would seem to me that the frequency of the latter condition in the 1100 uteri mentioned by Dr. Noble is hardly greater than would be observed in the same number of uteri without myomata, obtained from women in the middle years of life. Moreover, I can see no reason why the presence of a myoma should predispose to carcinoma formation.

On the other hand the same cannot be said concerning sarcoma, for there is no doubt that in a certain proportion of cases it is developed directly from the myoma, being usually derived from the connective-tissue cells between the muscle bundles, although in occasional cases, directly from the muscular fibers, as I demonstrated in 1894, and as has since been confirmed by many observers.

I would therefore say that the sarcoma is the only malignant growth which is directly derived from the myoma, but that it occurs sufficiently frequently to justify the removal of all myomata of any size, in view of the excellent results now obtained by supravaginal hysterectomy.

The case of chorioepithelioma should likewise be regarded as an accidental complication, as it is the direct result of abnormal pregnancy, and has nothing to do with myomatous formation.

After going over the entire table, I do not think that Dr. Noble has made out so strong a case for operation as he seems to think, although I agree with him that it is incumbent upon us to remove all tumors which have attained any considerable size.

Among the complications mentioned by him are 78 cases of cystic degeneration of the ovaries. This condition has nothing to do with the myoma, and I think should be left out of consideration.

I see that Dr. Noble mentions in his last lot of cases two cases of thrombosis of the vessels of the lower extremities, and I hope that in closing the discussion he will tell us how often thrombosis of the pulmonary vessels with fatal embolism has

occurred in the cases referred to. So far as I have been able to learn, it would seem that there is a tendency in women suffering from myomatous tumors toward a condition which favors such a sequela.

Dr. Beverly MacMonagle.—Some years ago Dr. Gordon read a paper in which he stated that fibroids should be removed from all of the patients who come to us suffering from symptoms of fibroids. He also claimed that they would not come to be treated unless they were suffering. At that time he was criticised rather severely for his view. It was my custom then to remove fibroids which were making any symptoms I could elicit, and it has since been my custom to remove them when attended with symptoms.

I quite agree with Dr. Williams that it is hardly fair to include carcinoma, epithelioma, and chorioepithelioma as being the consequence of fibroids. These are entirely independent growths. The fact that a fibroid may degenerate into a sarcoma is sufficient cause for looking upon large fibroids as serious matters, and we should remove small fibroids with symptoms, for surgical reasons, as I think in the end a large number of patients will be placed in a better position and condition, and operation in the early stages of the fibroid will give us a higher percentage of recoveries and lessen the risk or danger to the life of the patient. It will also allow us to make a choice of operation we wish to perform. In the younger class of women, when the fibroids are small, it is well to do myomectomy and save the functionating power. If the fibroids should return there is again the privilege of operating for their removal. The dangers and risks from a fibroid as it grows are multiplied very much. There is no doubt that it interferes with the blood stream; it interferes with the proper function of the Fallopian tubes and ovaries; it interferes with the proper function of the bladder and ureters, and thereby leads to serious disease of the pelvis of the kidney and incidentally of the kidney itself. It interferes with the functions of the bowel and with the nutrition of the patient. There is no doubt that pressure on the bowel by it and incidentally constipation are matters that may lead to the development of appendicitis and ovaritis. There is no doubt that these tumors make a patient anemic by the amount of blood they take up. There is no doubt in

my mind that an intrauterine fibroid that is pressing toward the vagina should be removed. A small fibroid that causes discomfort of any kind should be removed, as it relieves the patient from the chance of pain and incident prostration that may be due to an attempt at delivery of the tumor. An intramural fibroid should be removed. According to my observations, these fibroids are a source of suffering and pain, largely attributed to some form of dysmenorrhea. I have observed a number of cases that have been treated by all treatments that are known to us, such as dilatation, curettage, etc., for the relief of dysmenorrhea, and even splitting the cervix, and then finding that the dysmenorrhea was due to an intramural fibroid not larger than a walnut. The results of operation, when done early, will be very much better than when it is done late.

I have been making some observations in regard to what the results are on the circulation, but more particularly with reference to the heart and vessels in connection with fibroid tumors. I do not know how it comes about, but there is a certain percentage of brown atrophy of the heart in cases of fibroids of long standing. It is probable that there are a number of cases of gray atrophy, and I am inclined to think that there is a change in the vessels themselves, the fibroids exposing the patient to a serious general condition on account of their encroachment upon or interference with the circulation.

As to the surgical reason, in an operation for the removal of large fibroids when they are attached the operation is serious. When they are attached to the bowels, the bladder, the appendix and omentum, we have got a serious operation. We open the blood stream in many ways and expose the patients to the formation of an embolus. I have had two patients die from pulmonary embolism following the removal of fibroids. They were flabby patients, and in those cases there was brown atrophy of the muscle of the heart. The other risk is fat embolism—air embolism. Not long ago a colleague of mine had a patient die in a surprising manner. After the patient was removed from the table and put to bed, he went to see her and she was dead. It was beyond his ability to discover why she died. Chloroform was used; I told him I thought chloroform had killed her, but he resented that bitterly. He came to me afterward and said

a postmortem examination had been made, and it was found that a fat embolus had been the cause of death. That was the first case of fat embolus I ever knew, and it suggests another risk and another danger in leaving these operations to be done until after the fibroid becomes large.

Last year we had a symposium on the risks and dangers of fibroids in connection with pregnancy and confinement. While we were not entirely agreed as to the consequence of fibroids in connection with pregnancy and confinement, notwithstanding they are a source of anxiety both to the obstetrician and surgeon, yet the risk of removing them during pregnancy is certainly increased, because, while a patient may recover from an operation for their removal, it is probable that we will interfere in some way with the growth of the fetus or pregnancy, a delivery at an unfavorable time becoming imperative.

Dr. Seth C. Gordon.—I am always willing to stand up and take my medicine with as good face as possible. I am perfectly willing to admit all that Dr. MacMonagle has said in regard to what my position has been regarding fibroid tumors of the uterus. We have threshed out this subject several times of hysterectomy and myomectomy for fibroids. My last paper was on conservative gynecology. By conservatism I mean the conservatism of the health of women. If a woman has a uterus which is filled with fibroids and it is making her an invalid, I think that uterus had better be removed. My position at one time was this: that any woman who came to me with a fibroid which was making her an invalid, and I found that it was the cause of her trouble, I would resort to hysterectomy. That is even worse than Dr. MacMonagle put it, and practically I still stand by that statement. I admit that there are a few cases where we may remove fibroids by myomectomy and to the advantage of the patients. I have no question about that. I will modify my statement to that extent now, for I hope I have not lived this long and learned nothing. I am willing to do that with this reservation, namely, that the patient is liable to have another fibroid and is liable to a second abdominal section.

My experience of forty-nine years has afforded me very few cases of pregnancy occurring in women who have fibroids of the uterus. The number of women who have died from neglected fibroids of the uterus far exceeds the number who have become

pregnant with fibroids, so that while we may occasionally save a child which is valuable to the mother and father, I should say we more often lose the mother, the wife, who is more valuable to her husband and to her family. When it has been taught in this Society that we can remove large fibroids from the uterus and then do a ventrosuspension, it seems to me that is conservatism of organs and not conservatism of the health of the women, which we are all after. That is what we practice medicine for. We preserve a woman's health, and conservative gynecology is that which conserves health and nothing else. I believe that this thing has been carried too far. I recall the case of a woman who, two years ago, suffered an attack of peritonitis from a large fibroid. I advised and said everything I could to have a hysterectomy done, but she would not consent to it. Within the last ten days she has been close to death's door from another attack of salpingitis, and said that if she lives to get through this attack she will accept the advice I gave her two years ago and have the hysterectomy done.

I do not believe that we are justified in going into a uterus half a dozen times to remove one fibroid at a time, when we know the reproduction of fibroids is so common. A fibroid uterus may contain a dozen of little tumors, which you cannot find when you do your first myomectomy. Everybody knows that who is familiar with this subject, so that I still cling to the assertion which I made at least ten years ago before this Society, and Dr. Lapthorn Smith, in a paper read two years ago, said he thought I was ten years ahead of the rest of the members. I do not claim anything of that sort, but I still believe what I said then was in the main correct. Taking all the chances, taking everything that belongs to these tumors, and especially illustrated by the statistics of Dr. Noble this morning, although I do not quite agree with some of them, I am ready to say, as a rule, that when a woman comes to me with a fibroid that is making her an invalid, I advise her to have a hysterectomy done and get rid of all her troubles. The mortality is so exceedingly small that we hardly estimate it at all in connection with this operation. Therefore, I am not altogether ready to back out of any position I took in this Society ten years ago.

Dr. Edward P. Davis.—It would be interesting to have a statement of the mortality of operations for fibroids, and it

would be fair to compare it with the mortality occasioned by complications. Possibly Dr. Noble will favor us with such a statement in his summing up.

He mentioned cases of pregnancy as an indication for operation for fibroids. It seems to me considerable judgment is required in this matter, for the reason that we see pregnant women with small fibroids or a small fibroid pass through pregnancy without trouble, and in whose cases after the birth of the child the fibroid itself, so far as external examination is concerned, disappears, and I think it is a fact from observation that such women may even bear other children, and we cannot in all cases trace this fibroid to a rejuvenation, and some of these women do not come to operation. In other cases pregnancy and the presence of a fibroid or fibroids furnish an indication for immediate operation, as in a case that occurred a few months ago, where a pregnant woman had a fibroid infiltrating the right broad ligament. The situation of the fibroid was such that it seemed questionable whether she could bear a child through the vagina. Consent to operation was obtained, with the promise (the woman was of the Hebrew race) that we would not remove the uterus if it could be avoided. When the abdomen was opened, the situation of the tumor was such that delivery through the vagina would be impossible, and hence she was subjected to hysterectomy.

Pregnancy does not furnish alone an indication for operation for fibroids; there must be the situation of the tumor rendering the birth of the child impossible without its removal. We may let pregnancy go on to viability, then save the child, and do a hysterectomy. Again, in some cases the pregnant woman may not require treatment for the fibroid or fibroids by operation, while in others they certainly give rise to no further trouble after parturition.

Dr. John T. Thompson.—In reference to salpingitis, in my own personal experience, in looking up the matter some time ago, I found something like 20 per cent. of cases in which there had been pyosalpinx, not all of which were explained at the time of operation, but apparently had been from the gross or macroscopic appearance cases of actual accumulation of pus in the tube. I would like to hear the experience of other Fellows with reference to that, whether it has been a factor in deter-

mining these operations. I have found women suffering acutely where a fibroid existed, and it would seem to me to have been due in these cases to the presence of the fibroid.

Dr. Lapthorn Smith.—At one time I opposed the removal of the uterus for fibroids, but my reasons were clear and definite, as at that time the mortality was high, very nearly 50 per cent. and when Apostoli discovered the electrical treatment of fibroid tumors of the uterus I went to Paris, learned and practised it, and I know that I made a great many women comfortable without having removed these tumors. While I was doing that the mortality of hysterectomy was falling steadily, and when I found that it got down to less than 10 per cent. I was inclined to recommend the removal of the uterus. Now that it is less than 5 per cent. among expert operators, I urge every woman who has a fibroid to have it removed while it is small. Pregnant women are put to a great deal of trouble by the presence of fibroids complicating pregnancy, particularly when accompanied by pressure symptoms, and when operation is indicated they should be removed. I have also seen albumin which had been present in the urine disappear after the removal of the fibroids. In fact, I have operated on women because they had albumin, and casts in the urine disappear on the removal of the tumor. A great many of these women are quite ill from back pressure on the ureters; their condition gradually gets worse and worse, so that operation must be done sooner or later. Therefore, I believe in removing the uterus of every woman who is sick enough to consult a doctor for symptoms that are produced by the presence of a fibroid. I do not urge operation the first day a woman comes to me complaining of symptoms from a fibroid. I do not believe in operating on them the first time I see them. I keep them under observation, and general and local treatment, for a few months or sometimes a year, before I decide upon doing such a serious operation as a laparotomy. But if the patient at the end of this time is not getting better, then I urge hysterectomy, and I believe it is the wisest course for us to pursue. Occasionally during pregnancy I have resorted to myomectomy when the tumor was subserous, because I did not wish to run any risk in regard to the life of the child or the mother, having in view the complication of delivering the woman with a fibroid tumor.

Sometimes these tumors slough a few days after the delivery of the child. I recently read the report of a case of puerperal septicemia which ended fatally, which at the postmortem was found to be due to a sloughing fibroid tumor.

Dr. Howard A. Kelly.—I think this is one of the most important subjects in gynecology. The fact that a woman has a fibroid is never an indication *per se* for operation. Hundreds of women go about with small fibroids which never give any trouble, and which are often only accidentally discovered or are found at an autopsy.

As to the general indications for operation. In the first place, we ought oftener to make sure as to the size and character of the fibroid by putting the patient under an anesthetic and making a careful exploration, particularly by the abdomen and the rectum. Furthermore, we ought to make sure that there are no complicating conditions. If there is malignant degeneration of the endometrium it will show itself by hemorrhage, and curettage will determine this fact. Appendicitis and inflammatory complications can generally be determined by a careful history, associated with a careful examination. Many cases presented in statistical lists are operated upon, not because of a fibroid, but on account of a manifest ovarian tumor or dermoid cyst, and the fibroid is discovered incidentally. I do not recommend operation for small fibroids when they do not produce marked symptoms, such as hemorrhage or pressure on some viscus. If the tumor is in the pelvis and the uterus is mobile, I do not urge operation. It is, however, sometimes necessary to recommend operation because a woman is invalided by the mere thought of having a tumor. If the tumor is caught in the hollow of the sacrum and cannot be easily lifted into the abdomen, I then urge operation because of the risk of pressure upon vessels, particularly upon the ureters and bladder. When a tumor gets up into the abdominal cavity, the size of a five months' pregnancy, and there is pressure upon the vessels interfering with the ureters, I recommend operation, but I do not recommend it for smaller tumors which are loose and free in the abdomen, and produce no particular symptoms.

I heartily concur in what Dr. Davis has said, and I feel that operating on fibroids complicating pregnancy is very much overdone. I have seen cases in consultation with large masses of

fibroids, in which operation had been urged, and yet some of these cases have been returned to their homes and have had normal labors.

Dr. Noble.—It is agreeable to me personally to find that in general the speakers believe as I do, that if a woman has a fibroid tumor it should be taken out. But what surprised me was the manner in which some of the speakers criticised this table I presented. Of course, it would be absurd to say that all of these complications were caused by the fibroid tumor or tumors. Such an idea never occurred to me. So we need not discuss that phase of the subject.

The reason this table was compiled was this: the classic teaching is and has been that women with fibroid tumors are not sick. But the 1188 women who had these tumors and all the complications enumerated in the table were surely sick. To prove this was the object in compiling the table.

The next point is the relation between fibroid tumors and cancer of the corpus of the uterus. I am not attacking the accepted theory that sarcomas can develop only from connective tissue, and that carcinoma is developed from epithelial structures. That is not the point. The point is that in this series of cases the normal relation between the number of cases of cancer of the cervix and the number of cases of cancer of the corpus is vastly altered from the usual, and as the number of cases is very large, it seems to me, *a priori*, a reasonable deduction that the irritation produced by the fibroid tumors in the uterus is a predisposing cause for the development of carcinoma of the corpus uteri. Until the gentlemen who take the negative position can prove that is not correct, I shall continue to feel that that is true. Aside from that, I would not for a moment say that the presence of a fibroid tumor caused any of the other complications. I simply stated, as a matter of fact, that the women had the complications, a large number of whom were sick and who ought to be operated upon.

Let me refer to another interesting point with regard to cancer. This has not only been my experience, but Dr. Cullen tells me that his experience in a large number of cases observed by the Johns Hopkins Hospital has been that cancer of the corpus uteri is just as common with small fibroids as with large ones. So far as this particular feature as to the relationship

between fibroid tumors and cancer of the corpus is concerned, it has been shown by Cullen that there is a direct relationship between the two. That is, of course, a relative reason for operating on small fibroids as well as large ones.

Dr. MacMonagle discussed the question from a surgical standpoint, saying that we get better results if we operate early than late. He also spoke of the choice of operations. I quite agree with him, but I would add this to what he has said (and I think it is a strong reason for early operation): it saves women from an invalidism which they otherwise would have had.

Dr. Davis brought up the question of the mortality of operations for fibroids. I did not feel that it was necessary to go into that phase of the subject before this Society, as the Fellows are all familiar with it. My own opinion about the mortality is that if operation is done early it is about 1 per cent., but when done at a later period it may be 5 or 10 per cent., or even 30 per cent., depending upon how desperate the case is when you see it.

With reference to the remarks of my friend and teacher, Dr. Kelly, it is quite evident that his views of the subject of the indications for operation on fibroids are absolutely opposed to mine, and my own feeling is, after studying the matter carefully, that his position is not scientific. I believe we should operate on these tumors because we know what happens in the life-history of them, and it is far safer to take them out; the woman's chances for good health are far better when they are out than they are when the tumors are allowed to remain.

THE SURGERY OF THE FEMALE URETHRA.

By Ely Van de Warker, M.D.,
Syracuse.

The urethra in women appears like an insignificant part. Its vital relations are negligible, even its anatomy is relative and acquires its importance from its relation to a near organ. It is a simple integer in the sum of organs that gain in vital significance the farther they are from their terminal point—the urethra. But it may be said that it epitomizes a large share of the suffering that woman's pelvic organs inflict upon her. At the decline of functional activity of the pelvic organs, when a long-earned peace and comfort ought to be assured to the woman, the urethra obtrudes as a source of suffering. The amount of disturbance caused, by a simple irritation of the urethra, to the bladder and indirectly to the kidneys affords striking proofs of the validity of reflex disturbance. That these consecutive arrangements of the bladder and kidneys are rarely due to an inflammation of an ascending type will be shown in the course of this paper. Irritative rather than the inflammatory conditions, when existing in the urethra or at its meatus, may create the most active disturbance. The urethra gains a large share of its importance, therefore, as a center of nervous reflex, in this respect obeying the law that nerve centers having the widest sphere of reflex activity are situated at or near the natural openings of the body.

The first defect of the urethra to which I shall call your attention is what I prefer to call sacculation. The term

urethrocele used by some authors is a misnomer, its cause being mechanical. Inflammation alone is not adequate to produce it in view of the thinning of the urethrovaginal septum which is so frequently observed. The urethra may be said to belong more to the perineal than to the pelvic zone of organs. Consequently, the walls of the passage depend upon the support of the perineum to a certain extent only, as other causes may operate to produce the defect. I cannot recall a single instance of long-existing rent of the perineum, with the patient near middle life, but what a drooping of the urethral wall could be observed. In one of my case-books I have outlined a pendulous sac, its upper margin defined by the junction of the middle with the upper third of the passage. Residual urine was always present, causing urethritis with drastic strangury. Very much smaller dilatations will furnish cavities where a small quantity of urine will be retained, which is certain to cause frequent and painful micturition.

Another cause, which generally affects the whole of the canal, is stricture at the meatus of a caliber so small as to need expulsive efforts to overcome the resistance. A urethral opening of from No. 10 to 13 F. will offer an obstacle that will require expulsive effort to overcome, accentuated as it so often is by urgent and frequent micturition. The bladder may suffer damage under these conditions; but the urethra, receiving the full force of the expulsive effort, suffers more. Here comes in a singular fact in mechanical pathology. The bladder, being a contained viscus and supported on all sides, becomes thickened in its walls. A superficial explanation would be that this was due to increase in its muscular layer, but a careful examination shows that this is not the explanation. The increased thickness occurs in the mucous layer, and is undoubtedly of inflammatory origin. The wall of the urethra being unsupported for about one-half of its periphery becomes thinner at the sacculated portions. I take this to mean that the dilatation is due to mechanic force rather

than to inflammation. I lay stress on this, because our late colleague, Dr. Skene, in his work on *Diseases of the Bladder and Urethra in Women*, traces nearly all of these conditions of the urethra to inflammatory action.

Local treatment, aside from antiseptic means which simply palliate, I have never seen cure the condition. I speak from experience gained from my own work when I say that a plastic operation is necessary. When the perineal body is torn away and the urethra is unsupported and hanging in the vulva the part must be restored and the operation made with the special object in view of giving support to the damaged urethra. Many of the operations devised will not lift the perineal body closely against the middle third of the urethra. By my method this is gained by carrying the flap well above the crest of the rectal prolapse and extending the flap latterly more than would be necessary to give support to the lower segment of the bladder. First, it is necessary to care for the sacculated urethra. We are here dealing with redundant tissue. We can only hope for absorption to a very limited extent, even after the part is supported. I first began by removing the outer mucous and the muscular layers of sufficient width to obliterate the sac, making due allowance for the contraction that follows repair. This method, while it removed the tangible evidences of sacculation, did not relieve the patient of all the symptoms caused by the dilatation. Through the urethroscope I observed that the mucous lining was thrown into folds. A very little reflection would show that this was a necessary result, since the redundancy existed in three layers, while it was obliterated in the outer two only. The operation was extended to include the mucous membrane and into the lumen of the urethral canal. The cut surfaces were brought together with interrupted sutures placed close enough to make the urethra water-tight. A self-retained catheter, which I found added to the suffering of the patient, was thus avoided. The surfaces were brought together over a sound held in the

urethra, so as to ensure a uniform lumen to the canal. This method I found gave almost immediate relief. In my opinion, confirmed by an ample experience, absorbable sutures ought not to be used in this operation, as they are exposed to the current of urine; and, no matter how thoroughly aseptic when introduced, are quite certain to become contaminated before absorption. Fine silk I found to be superior to any other form of material.

Not until after the plastic operation on the urethra, the sutures removed and union found to be perfect, was the final operation made upon the ruptured perineal body. Both operations could, of course, be made at one sitting; but while certain genital-plastic operations appear naturally to suggest the method of multiple operations, in this instance it appeared more prudent to await the result of the operation on the urethra, as this would govern to a certain extent the restoration of the perineal body. I have never had a urethral fistula result, and the functional results have been without fault. This method is needed only in extreme cases. In the minor degrees of sacculation a restoration of the perineal body, carried out with the purpose of giving support to the middle third of the urethra, will cause the gradual absorption of such redundant surface as may exist.

Prolapse of the mucous lining of the urethra is another condition with which I have had sufficient experience to cause me to dissent from some of the commonly accepted explanations. The condition is a rare one, and, consequently, the defect has not been closely studied. In my cases one condition has always been apparent in the history. For years the patients have complained of urinary troubles of various kinds. Dysuria, dribbling, escape of urine on exertion, were nearly always present. It is probable, therefore, that it is the result of a gradually progressive condition, and in this respect complies with the general law of genital ptosis. In matters of pelvic dynamics, a department of gynecology as yet unstudied, except in a disconnected way, we must

abandon inflammation as a general etiologic factor. If inflammation along the urinary exit is present we have a thickening of the urethral mucosa. In ptosis of this part we find a contrary condition; the mucous lining becomes thin and delicate, almost too attenuated to hold a suture. Such being the condition as I have observed it, the detrusor urinæ is the part at fault. The strenuous expulsive effort exerted, often attended with an expulsion of urine inadequate in quantity to the force expended in its expulsion, throws the retrusor effort upon the loosely connected mucous lining, which gradually gives away and tends downward toward the meatus. As the process continues the membrane finally presents as a red and irritated fold at the urethral opening. It follows that we have a complicated condition to deal with. A simple snipping off of the extruded mucous membrane and suturing the edges to the periphery of the meatus would fail to cure the condition. After an operation of this kind the patient will present herself a few months later with a recurrence of the prolapse. Several times I have seen it recur until one would be in doubt whence such a redundancy of the mucous membrane could come. I have been led by observation to believe that the hysteric bladder is one of the first conditions at fault. Twenty-five years ago, when I organized my private hospital, a case occurred that taught me a few facts that I have never forgotten. A woman, aged about forty years, was admitted with a history of bladder intolerance extending over many years. She was a member of the Oneida Community, and consequently she had been under the care of competent experts. She had continued to suffer severe dysuria in spite of the best treatment the country afforded. As there was a considerable prolapse of the mucous membrane it was removed, and the edges sutured to the outer mucous covering. She was considerably benefited by the operation. The bladder stress, while lessened, was not wholly relieved. This poor woman visited a drug store and purchased a fatal

dose of morphine. The case was promptly turned over to the coroner. At the postmortem examination, at which I was present, I asked that the bladder and urethra be carefully removed. This was done, and an inspection of the gross and microscopic appearances made. The bladder was absolutely healthy and without a trace of inflammatory action. It was simply an instance of hysteric bladder, and the prolapse of the mucous membrane was the result of the excessive action of the detrusor urinæ. From a study of my cases the history demonstrates that the prolapse is never acute, but is secondary to other conditions not limited to the urethra, and is chronic and slowly progressive.

The treatment is simple. I have never tried any other method than snipping off the redundant membrane and securing the edge to the external mucous membrane, healing being rapid. I have met with recurrences, and these were confined to cases in which the predisposing conditions of the bladder were more or less active. Unfortunately, these bladder diseases are sometimes most difficult to cure, but until relieved we may expect to meet with a recurrence. The operation is necessary, however, as the prolapsus may aggravate the pre-existing bladder symptoms, and also for purposes of cleanliness. The stream of urine as it escapes from the muffled opening often feathers, or is diverted so as to soil the outer parts of the clothing.

Bladder incontinence and dribbling are among the most distressing of urinary defects. While often painless, yet the effect on woman's pride and self-respect is serious. In this contribution to the discussion we are concerned only with urethral conditions which result in these symptoms. Imperfect control of the escape of urine is sometimes a lifelong affliction. Laughing, coughing, sneezing, sudden changes in position may cause a gush of urine. The bladder may be nearly empty when this occurs, without the usual sensation of voiding urine. I have never been satisfied with the usual

explanation given for this symptom. That it is always a deficiency of the sphincter vesicæ is more than doubtful. The vesical extremity of the urethra can readily be narrowed. I have done this by removing an elliptic-shaped flap through the muscular layer on the vaginal surface and suturing the edges together. The result is a considerable narrowing at the urethrovesical junction. I have traced good results to this method, but I never knew it to be lasting. The other plan was to violate my rule, never to apply destructive caustics to the urethra. They are uncertain in their effects, and the applications are difficult to limit and control. In the few instances in which I have tried caustics the applications were made through a urethroscope; a small bead of caustic was fused upon the point of a probe invented by the late Dr. Lente, of Cold Spring-on-the-Hudson, for this purpose. Two or three linear applications were made at or slightly above the urethrovesical junction. These applications were always followed by pain and strangury. This method produced some improvement, but the effects were not permanent. Systematic writers offer very few practical suggestions for the treatment of this condition. Journal articles are frequently met with in which the authors extol some nearly infallible methods of treatment, but they were never afterward heard from, as they certainly would have been had they possessed any merit.

The other phase of urinary incontinence, or dribbling, has caused me to believe that we are dealing with a neurosis instead of a local organic defect. The frequent association of dribbling with attacks of hysteria point to the powerful influence of functional nervous disease upon the urinary tract. These organs are within the zone of hysterical disturbance. In fact, we do not need anything more marked than what may be called the hysteric temperament to find the kidneys secreting enormous quantities of fluid of a specific gravity as low as 1002. Such a condition often marks the occurrence of a nerve storm which, without the

polyuria, would have escaped notice. The urinary tract in this relation may be said to be the storm center of hysterogenesis. If I am right, the intractable nature of the difficulty is explained, and the case belongs to the neurologist rather than to the surgeon.

There are other instances of defective bladder control that are easily cured when the cause is understood. The urethral stricture, when of small caliber, is very frequently associated with dysuria and dribbling. It is difficult to understand why a stricture located at the meatus should involve the sphincter vesicæ. We find the same symptom in the male from stricture situated in any portion of the canal. Dilatation is the only method by which the retaining function of the part can be restored. Caruncle and neoplasms of the urethra may cause lack of control. The practice of applying caustics to the base of the caruncle when located at the meatus is a bad one. Damage to the urethra from cicatrices is one of the most difficult to relieve, especially so when the result of the imprudent use of caustics.

Fissure in my hands has always been cured by dilatation. I have always used the finger as the instrument for this purpose. Unless the finger of the operator is too large you are safe against incontinence or rupture. It is to be regretted that solid caustics are recommended in Skene's book in the treatment of fissure. In addition to being inefficient the use of caustics is a relic of primeval surgery.

Urethral polypi deserves a brief reference. The true mucous polypus must be comparatively rare. I have seen but two examples. The condition had been overlooked in both cases as a cause of strangury and incontinence. The growths were too friable to twist off as recommended by some surgeons. Had the growths been so firm as to allow removal by this method it would have been a very crude proceeding, as a stump must have been left which would have made recurrence quite probable. A pair of slender, probe-pointed scissors is an excellent instrument for this

purpose. The connection of the growth should be cut away deeply so as to insure against its renewal. Other forms of growths in the urethra I have never seen.

Stricture of the urethra is, in my experience, very common in women. My views upon this subject have been regarded by some as radical; but, if so, the facts warranted a firm expression of opinion. Dr. Howard Kelly, in his *Operative Gynecology*, says of my work that "confirmation of these important conclusions are still wanted from other clinicians." Unfortunately, Dr. Kelly quotes from my first article upon this subject and not from the more elaborate paper published in the *Medical Record* in 1890, and read before the Section on Obstetrics and Gynecology, American Medical Association, at Nashville, in May of that year. If other clinicians have not confirmed my conclusions, Dr. Kelly has done so, for the section given up to this subject in his comprehensive treatise is more elaborate than is found in the work of any other systematic writer, even in special volumes, such as those of Drs. Winckel and Skene. This liberal and copious treatment of the subject leaves only one phase in suspension between us, namely, that stricture of the urethra in women is the analogue of the same condition in the male.

The time allotted will not permit an account of the pathology and causes of stricture in women, and I will only give in outline the facts presented and the treatment advised in my paper in the *Medical Record* of August 23, 1890. Since the publication of that paper I have been more firmly convinced of the truth of my contention. The causes may be summarized: that any condition that tends to produce a long-continued irritation of the urethra may cause linear or annular thickening of the mucous lining, and thus lead to stricture. Gonorrhea in the male, from its tendency to become chronic, is a frequent cause of stricture. Specific inflammation of the urethra in women does not present the same clinical picture. The attack on the urethra is generally

secondary to a prior invasion of the vagina, where the gonococci have expended the greatest virulence. In the majority of cases of specific vaginitis treated by recent methods the disease does not extend to the urethra at all, and when present generally is of short duration. While specific urethritis may produce stricture, it must be an infrequent cause, and is not the important factor claimed for it by Herman[1] and by Fissiaux.[2] I name these authors because they are so frequently referred to by writers even at the present day. Traumatism, the other factor alleged by the authors and duly followed by others, is next in frequency. Injury to the urethra sufficient to cause obstruction is not a true stricture. This may appear like splitting hairs, but when it comes to the treatment it will at once appear to have considerable value. All gynecologists know that injury to the urethra from parturition, unless it produce fistula, is extremely rare. In thirty years of gynecologic surgery I cannot recall a case. Injury from other causes have occasionally been met with. In one case the urethra was severed transversely with a severe lacerated wound to near parts, requiring many ligatures to pumping vessels, which healed without causing stricture. In another case the woman fell upon a small stick which penetrated the pelvis, tearing one side of the urethra lacerating the vesicovaginal septum. In this case stricture did not follow repair and healing of the urethra.

The point in contention is the existence and clinical importance of stricture of large caliber in women. This is a condition so easily proven that it appeals to one's sense of the ludicrous that there should be any dispute upon the subject at all. This difference of opinion turns upon the method of exploration. Even our best writers do not advocate a method of exploration that will bring out the facts.

[1] Transactions of London Obstetrical Society, 1887, p. 27.
[2] Annales de Gynécologie, January and March, 1879.

Kelly advises that the urethra "be calibrated with bougies." Skene, following Winckel, directs "that the passage be explored with the sound, using one so large that it will not pass, thus locating it, and then by using a sound that will pass through it the extent of the obstruction may be known." By this method of exploration you would learn the caliber of the obstruction, but you would never know when you had passed through and reached the proximal side. If general surgeons were to write upon male stricture and advise such a method of exploration there would be very few strictures that we would know much about. It is by methods such as described that the period of error has been prolonged. There was a time within the memory of many of us when our knowledge of stricture of the male urethra was rudimentary, concerning which careful instructions had been given for generations. Then came a time, however, when by the use of instruments of precision we gained a more perfect and wider range of knowledge. Previous to this period the general surgeon gave about the same instruction concerning exploration of the male urethra that Dr. Skene has given for that of the female. It cannot be disputed that so far as stricture of the female urethra is known and treated it stands to-day where the surgery of the male urethra did a generation ago. I date our present knowledge of stricture in the male of large and small caliber, their number, location, and extent, their consistency and dilatability, together with the caliber of the passage yet in a normal condition, to the invention and general use of the exploratory bulbs and urethrometer. If we trust urethral exploration to the sound we simply learn that we have to deal with a narrowed passage and we overlook obstructions of large caliber entirely; whereas, if we explore with the bulbs we learn not only all that the sound can reveal, but also the extent and number of the constricted points, their firmness and dilatability, and the differential diameter.

I do not think my contention an unreasonable one when

I state that the female urethra demands the same care and exactitude of exploration that we give to the male parts, and, if made with equal care, the average clinician will be convinced of the existence of strictures of large caliber in women.

Some attention has been given to the subject: what is the normal lumen of the female urethra? I do not understand how a solution of this question can throw any more light upon a strictural condition than a knowledge of the average diameter of the vagina would aid us to an understanding of an atresia of that passage. The question is not the normal diameter of any particular passage, but is it free from contracting bands or inflammatory deposits that diminish its size, be it large or small? The extreme dilatability of the female urethra gives less need, than in the male, to establish the law of average. In my own observations to test the caliber of the normal urethra I noticed the liability to error from the extreme dilatability of the passage when in a healthy condition—an error more difficult to guard against when using the urethrometer than the bulbs. I have, therefore, abandoned exact measurement for the exploring bulbs, and have always found them a safe guide in detecting constricting bands. In exploring for narrow constricting bands use a bulb equal to the full capacity of the normal urethra when it will slip over narrow obstructions. Sometimes the bands are arranged in groups, and the bulb will slip along in a series of jerks; but usually one or two obstructions are found in the middle to the outer third of the passage. The lumen of the normal urethra is not the same throughout its length. It is contracted at the meatus, expanded in the middle portion, and contracts again toward the bladder, hence the bulb will move with more freedom in one portion of the urethra than another. Symptoms of functional disturbance due to stricture have their periods of exacerbation and intermission. A patient will give a history of dysuria with intervals of relief lasting for days or even weeks. Often

times the patient rises in the morning in a comfortable condition, with a renewal of the urinary symptoms during the latter part of the day. The control is sometimes impaired, the patient being obliged to promptly respond to the inclination. In strictures of large caliber the symptoms do not appear to depend upon the extent to which the lumen of the canal is encroached upon, but rather upon the degree of irritation existing.

The form of stricture most frequently met with and one that causes the most active symptoms is the annular stricture of the meatus. It is a firm ring situated at the verge of the opening. It offers quite a solid resistance to the introduction of the exploring bulb, which sometimes has to be pressed firmly against the contraction before it yields, and, what is even more characteristic, offers about an equal resistance on withdrawal. It is generally necessary to dilate the stricture to the normal size in order that a bulb may be passed to test the condition of the urethra farther up. The dilatation of the stricture at the meatus is painful. It is better to divide the obstruction and keep it dilated until the incision heals, as the tendency to contract is fully equal to its dilatability. Very small strictures near the meatus are rare, as the meatus becomes involved later. These strictures more often cause retarded flow than retention. Women are so frequently the subject of urethral and bladder symptoms that the condition is nearly always explained otherwise. What in man would lead to a urethral exploration, even on the part of a very ordinary surgeon, is overlooked in women, except in cases of exceptional severity.

A condition is sometimes met with which is usually described as eversion of the mucous membrane at the meatus. This, in my opinion, is a form of stricture. Cases treated as such have made lasting recoveries. Its prototype in the male is the fusiform stricture of Otis. In women it is met with as a rolling out of the mucous lining which presents at the meatus as a red, irritable margin. When a

bulb that will pass the opening is introduced the membrane is pushed before it, the resistance ceasing when the bulb passes the ring. On withdrawing it its shoulder is caught by the ring of mucous membrane, which is drawn out to its former position and gives considerable resistance to the withdrawal. All of these obstructions at the meatus are more frequently met with in married women at or past middle life. I have been led to believe by a careful study of the condition that the functional use of the parts is the most frequent cause.

Polypoid growth of the urethra must be comparatively rare. In thirty years, during the latter part of which period conditions of the urethra and bladder received careful attention, I have seen but two cases. Both of these were of the mucous type. Cases in which the fibroid element predominated must be still more rare. From a histologic point of view this would be a logical conclusion, as it would be difficult for a neoplasm at this point to become a fibroid derivation. Both of my cases passed through the hands of very competent surgeons. One had its origin near the neck of the bladder. The urinary stress had been of a most painful character for many months. The second case showed itself as a very vascular tubercle in the cleft of the meatus, which had been cauterized repeatedly. It was removed by a slender probe-pointed scissors which snipped the pedicle deeply in the surrounding mucous membrane. There was no return of the growth.

Caruncle of the urethra is a common occurrence. An instance of this growth as figured by Kelly in Plate IV., Vol. I., of his work I have never seen, and I conclude, which may be wrong, that the perpendicular form of the growth is not so frequently met with. Those that I have seen were attached by a broad base to the margin of the urethra, sometimes in clusters, but more often discrete. Cases in which there is dysuria, a condition very commonly found at the meatus, may lead the inexperienced observer into a mistake.

I refer to the tabs or flaps that very frequently occur at this point. They appear as duplicatures of the mucous membrane, and are pale and insensitive. They show a great variety of forms. Sometimes there is but one flap attached to the lower margin, and often bifurcated, or lateral to the opening, which gives it a ramiform shape. They offer no obstacle to the escape of urine and do not harm. Under the condition stated I have known these to be scissored away under the idea that they were caruncles. In removing caruncles, although they bleed freely at first, especially when growing above the meatus, yet I have never seen a case that firm pressure would not relieve. Unless the scissors are applied deeply at the base, these growths may recur. If, however, removal is complete, the cure is effectual.

Malignant disease of the urethra is fortunately rare in its primary form. One case that I had an opportunity to observe in its later form began at one side of the prominence of the urethra, invaded the meatus, and extended downward into the clitoris and nymphæ. Several surgeons who saw it called it tuberculous. It was, however, an epithelioma of the adenoid type. It was removed by a free dissection of the urethra clitoris and nymphæ, leaving quite a surface to granulate, as it could be but partly covered by a flap. The disease continued, the patient dying three months after the operation.

Secondary cancer of the urethra is more commonly observed. Cancerous infiltration of the anterior vaginal wall from disease located in the cervix uteri is the more frequent form. These cases have no interest to the surgeon, except from the anxiety that he cannot help feeling lest the urethra becomes closed by the diseased mass of infiltrated tissue about it. This I have never seen occur. It is surprising how well the urethra preserves its function in these cases. Even dribbling does not often occur, and micturition may be painless. I have more often seen this vaginal extension of the disease with implication of the outer

surface of the urethra in cases of recurrence of the disease after hysterectomy than when this operation was not done. Other varieties of malignant disease of the urethra I have not seen.

DISCUSSION.

Dr. Thomas J. Watkins.—These valves of the urethra, which Dr. Dickinson has described, are not remnants of the hymen. There is no relation between the size of these valves and the size of the caruncular myrtiformes. In fact, one frequently sees rather large urethral valves where there are little or no remnants of the hymen. The urethral valves may be bilateral or there may be a single valve with or without a slit along the median line posterior. There is no doubt that the valves over the female urethra are analogous to the small mucous folds found in the male urethra at the meatus, and that their function is solely one of protection to the urethra.

As regards the diagnosis of infection of Skene's urethral glands, I would direct attention to a paper that I read some two years ago entitled "Notes upon the Diagnosis of the More Common Gynecologic Diseases."[1] Frequently one of these valves is much larger than the other, and I contend that the unequal size of the two valves is diagnostic of infection. One can palpate the glands by engaging the gland between the palmar surface of the finger, and pubic bone. I take it, that the enlargement of the distal portion of the urethrovaginal septum is always the result of infection, and that hypertrophy is also the result of infection; that consequently a thickening of the urethrovaginal septum is nearly always diagnostic of an infection.

Disease of this part of the urethrovaginal septum does not produce incontinence, because the structures that give control to the bladder are located at the neck of the bladder. Incontinence of urine in the cases under discussion is the result of a downward, and not a backward, displacement of the urethra in the cases that have come under my observation.

[1] Journal Am. Med. Association, 1900.

As regards the treatment of infected Skene's glands I have obtained ideal results by incision of all the tissue between the lumen of the gland and the vaginal canal, and by excision or by thorough cauterization of the diseased mucosa.

I am inclined to disagree with Dr. Van de Warker relative to prolapsus in these cases, as on examination of a large number of dispensary patients and quite a number of patients in private practice I have almost never detected backward displacement of the urethra. The displacement is always downward. If one desires to restore a prolapsed urethra to its normal location, in these cases, they cannot do it by pressing the urethra against the pubic bone, but restoration of the urethra to its normal location is accomplished by pressing the urethra upward toward the cervix.

It seems to me that the ideal result in the operative treatment of urethral prolapse is obtained by a bilateral denudation and suture which I reported some eight or ten years ago in the *American Journal of Obstetrics* and in the *American Journal of Gynecology*.

Dr. Charles P. Noble.—I wish to adhere to the subject as closely as possible. I read a paper by Dr. Dickinson which dealt with the relation between these structures and hypertrophy of the nymphæ from masturbation. Dr. Dickinson's paper on hypertrophy of the nymphæ came out some time ago, and shortly after it two young women with hypertrophy of the nymphæ consulted me. Being impressed with the doctor's accuracy of observation, I committed the indiscretion of discussing this subject with these two young women, and they promptly called me down. Both of them vehemently denied any imputation that they had ever been guilty of masturbation. Shortly after that three neurasthenic, nervous women consulted me, and I could find no explanation for the symptoms, but each of them voluntarily told me that she had been a masturbator since she was six years of age, and in these three cases the nymphæ were below the normal type in size. I concluded, so far as my ability to make a diagnosis of masturbation from the size of the nymphæ was concerned, I was not successful.

With reference to the treatment of these eversions of the urethra, I have been in the habit of treating them in one of

two ways. Where the eversion was not extreme I have succeeded with the cautery wire, such as nose doctors use to cauterize the inferior turbinated body, in making one or two longitudinal cauterizations, and in cases which were extreme I have usually amputated the lower end of the urethra. In one or two cases the eversion was extreme. In one in particular the entire urethra up to the bladder was everted and sloughing, so that it was plain that if the patient was treated by amputating the mass there would be no urethra left. I, therefore, made longitudinal incisions, removing some of the sloughing tissue, pushed the urethra back in situ, stitched it in place, and got a good result.

Dr. A. H. Buckmaster.—I do not believe in using the cautery in erectile or semi-erectile tissue like that found in the urethra. The burn is followed by reflex symptoms, distortion of the meatus, and by scars which are an invitation for the formation of cancer. I do not see how any intelligent man can deny the close relation between scar tissue and cancer. If it is necessary to cut away the tissue about the mouth of the urethra it can best be done with a pair of fine scissors. By their use you can take exactly what you want to take. By stitching the wound up afterwards with a small round needle no raw surface is left to granulate. A not uncommon cause of vesical irritation is a thickening of the urethral mucous membrane due to hypertrophy and congestion. This thickened mucous membrane may in time obstruct the passage so that we may have the same symptoms that we have with an enlarged prostate. The cause of the condition is the advancing child's head in labor. It catches the mucous membrane against the symphysis and skins it off its submucous bed. There may or may not be a tear. The result is a rosette of swollen and hypertrophied mucous membrane at the opening of the urethra that is called a "urethral caruncle." It is properly a "urethral hemorrhoid." This is of course not the only cause for vesical irritation. It occurs in neurotic patients without any physical basis just as disturbances of function occur in other organs of such patients.

Inflammation is another cause and a common one. I do not mean inflammation of the wall of the bladder, which is rare unless produced by the physician, but inflammation of

what I call the posterior band. Contrary to the books on anatomy the uterus has but two supports. One is the anterior band, which is triangular in shape and includes all the tissues that bind the uterus to the anterior wall of the abdomen and pelvis. It is composed of peritoneum, the walls of the bladder, the urethra and the anterior vaginal wall. It is very strong and unyielding on account of the large amount of fibrous tissue it contains. The other support is the posterior band. This includes all the tissue that ties the uterus to the posterior wall of the pelvis. It is composed of the peritoneum and the utero-sacral ligaments. It is very elastic and allows the cervix to be pulled to the vulva without harm. Inflammation of the tubes or the ovaries causes this band to become filled with fluid and like a rope in this condition it shortens. You can prove this by examining a patient with such an inflammation and note how the uterus is drawn high up in the pelvis. As the inflammation becomes less the uterus may be felt to be lower and lower. The difference is perceptible from day to day as the patient improves. Now, pulling on the posterior band will pull on the anterior band and in time the neck of the urethra will be involved in the strain. This is followed by vesical irritation.

The statement may be proved by seizing the cervix with a tenaculum and drawing on it vigorously and the same vesical uneasiness will be complained of.

It seems like a paradox to say that elongation of the posterior band will also produce vesical irritation, but such is the fact. If a woman is on the back and there is elongation of the posterior band, the uterus will sink in the pelvis and a full bladder will carry the fundus backward. There is nothing to make it return when the bladder empties and it stays there subject to the downward thrust of the abdominal pressure. The uterus will become congested and heavy, and in this way may drag on the neck of the bladder, producing vesical irritation. There are other causes for vesical irritation which time will not permit me to mention.

When the mucous membrane is too voluminous Emmet slits a hole in the urethra, and, drawing through the excess, cuts it off and thus disposes of it. I have in a recent case been somewhat more radical. I have opened the whole canal to the neck

of the bladder, taken in the slack and then brought the edges together with entire relief of the symptoms.

Dr. Lapthorn Smith.—I take the view, as I think most of you do, that the condition of the urine has a great deal to do with the production of this irritation about the mouth of the urethra. Frequently professional friends of mine have sent me patients and asked me to examine them for diseases of the urethra. On examination the mouth of the urethra has been found inflamed and there has been a ring of prolapsed mucous membrane, but after a trial of a week or two in making the urine non-irritating this trouble has disappeared. I find that when these patients come to me the urine is excessively acid and very irritating, and when I teach them to drink a good deal of water and put them on alkaline treatment the trouble disappears, and as the urine becomes mild or alkaline so the inflammation about the urethra disappears and the extruded membrane returns to its normal condition. I oppose the use of the cautery in these cases, because we should not, if possible, permit cicatricial tissue about the genital organs. I would rather make a clean-cut incision in attacking the lower ring of the urethra, or open up the urethra and remove the pathologic condition in that way.

I have had two cases of primary epithelioma of the urethra during the last year. I removed them completely, also a fair margin of healthy tissue about them, and the patients are well to-day. I would strongly urge the trial of mild measures in these cases before resorting to more radical ones.

I have had several cases of polypi of the urethra which were easily removed, and in these there was a history of long-continued acid urine.

Dr. Bache McE. Emmet.—While the ground for the remarks I wish to make has been partially covered by some of the preceding speakers, still I wish to say a few words in connection with these papers.

With regard to the bladder symptoms in these cases, they are often attributed to a wrong cause or causes, and when they present themselves, as Dr. Smith has said, we have to deal with them as best we can. It is best to deal with them locally and endeavor to remove the cause on which they depend. If I may be allowed, I will make a drawing with a view to illus-

trating and bringing out more forcibly, if possible, the point I desire to make. If we take this (pointing to a diagram on the blackboard) to be the pubic bone, and this (indicating) as the sacrum, and imagine here throughout the proper plane we have the bladder and the uterus more or less in this position (indicating), and then keep in mind what the structures are, bowel behind and peritoneum with its folds, we find in most cases, except in those mentioned by Dr. Van de Warker, where sacculation is present, more or less destruction of the parts, dependent more or less on injuries sustained during parturition. The best method, I believe, consists in bringing the parts together, including the mucosa, taking into account the benefit to be gained by making a buttonhole operation. Having united the parts in the manner described here (referring to illustrations on the blackboard), the hypertrophy can be very much diminished, the parts restored to a healthy condition, and the fistulous opening in the base of the urethra can be closed.

In the hysteric bladder, or neuroses generally, much will depend upon remnants of old inflammation of the tube or tubes, as Dr. Buckmaster has referred to. In holding the bladder more or less in a dependent position the uterus moves with it. When the bladder fills, the uterus recedes or is pushed back. When the bladder empties, the uterus comes forward, and the bladder is held by the uterosacral ligaments and fascia here (indicating), so that when these parts become relaxed there is a certain amount of descent of the uterus, and this certainly has an effect upon preventing the complete emptying of the bladder. There is a lack of power or of abdominal force from above, and this is of some import. As the muscular structure of the bladder is brought into play in these cases, hypertrophy is likely to occur, setting up possibly a urethritis which is only a symptom first. If we build here (indicating) cellular tissue in connection with the uterus, we should also have some of it in the peritoneum behind. There is a good deal of inflammation resident in these parts from old pelvic disease, and there must be necessarily a certain amount of mobility of the uterus. It puts the bladder at a great disadvantage. Great effort is made to cure these cases of bladder trouble in this way by building up the perineum properly and inserting a pessary which will carry the cervix back in its

proper position, and by raising the uterus to its proper level the bladder will be much improved.

Dr. Walter P. Manton.—There is one point in connection with the sacculated urethra that I desire to speak of. I have found that a small piece taken out of the anterior vaginal wall, as pointed out by Dr. Dickinson, has relieved symptoms in the majority of cases, but not in all.

About a year ago I had a patient whom I treated in various ways. I performed this operation with only partial relief, and, at my wits' end to know what to do, I did Reynolds' operation for cystocele. In this case there was only slight sagging of the anterior vaginal wall, and no cystocele. But the operation was successful in that the patient was entirely relieved of the symptoms of which she had complained for several years. As the result of this operation the upper portion of the urethra, with the neck of the bladder, was drawn up, and relief of the symptoms followed.

Dr. Howard A. Kelly.—I am much interested in the subject to which Dr. Dickinson has directed our attention, and I have already had a journalistic tilt with him over this matter.

I find it very difficult to question my patients about masturbation. Once in a while they come to me and confess the practice and once in a while I have timidly ventured to ask about it; the result is that my experience is but small. My conclusion, however, regarding the differences in regard to Dr. Dickinson's and my differing views in regard to urethral labia is that he is speaking of one thing while I am talking about an entirely different matter.

I was struck with the fact that the urethra had definite labia when living in Philadelphia over fifteen years ago, at which time I made a number of sketches, and seeing the word "labia" in Skene's little book on the *Urethra*, I wrote and asked him what he meant by the term; I asked him whether he simply meant the rounded margins of the urethral orifice, and he replied that he meant just that and nothing else.

Luschka, with characteristic clearness, yet not fully describing these little organs, refers to them in his *Anatomy*. I first described them in the last century in the *Twentieth Century Practice of Medicine*, published by William Wood & Co.

I am certain that these labia of the urethra are normal

anatomic structures, and are not in any way associated with masturbation. The structures to which I refer are delicate, flexible, slender, sharp-edged, projecting mucous folds, not in the least thickened or altered anatomically, similar in character to the virginal hymen.

If you will permit a blackboard diagram (drawing), at the first inspection these urethral labia appear as convenient folds covering the orifice. Then, if you put a trivalve speculum in the vagina and open it they open widely exposing the urethral orifice. If you introduce a speculum into the urethra, these folds lie over the sides of the speculum and can be seen very well in profile. I know nothing of the hypertrophies associated with masturbation spoken of by Dr. Dickinson. These are definite anatomic structures, and as far as I know have nothing whatever to do with masturbation.

With regard to Dr. Van de Warker's paper one of the most important questions of to-day is how best to deal with a urinary incontinence developing in women from forty years of age upward, and while certain simple methods of operation, such as raising the vaginal floor, cystocele operations, the wearing of a pessary, an oval resection under the urethra, are at times successful, I have not found them satisfactory in the majority of cases. I have adopted the following plan with extreme satisfaction in several instances: the exposure of the anterior vaginal wall, a longitudinal incision over the internal orifice of the urethra, which is then dissected away from the vagina. Having detached the vagina from the urethra and the bladder in this way, and exposed the entire neck of the bladder, up at the sides as well, I then pass three buried fine silk sutures on either side to pin the urethra and the neck of the bladder up behind the symphysis in its normal position, so as to prevent downward displacement and outward rotation of the urethra. In addition to this I have also taken great pains to dissect out the sphincter at the neck of the bladder, and fold it on itself, using two fine silk sutures. In one instance the sphincter was clearly torn, as the bladder mucosa could be seen as soon as the vagina was dissected away.

Dr. George Gellhorn.—With the permission of the Society, I wish to say a few words bearing on the embryology of the subject discussed in Dr. Dickinson's paper. Four

theories have been advanced in order to explain the development of the hymen. The first of these, advanced by Koelliker, Nagel and others, ascribes the origin of the hymen to the Müllerian ducts. According to the second theory, which was propounded by Berry Hart, the hymen originates from the Wolffian ducts. According to the third theory, advanced by Schaeffer, the hymen is derived from both the vagina and the vulva. The fourth theory, finally, is held by Pozzi. This author declares that at about the ninteenth week of fetal life two linear elevations can be seen on either side of the sinus urogenitalis. These elevations, from which later the hymen originates, unite behind at the fourchet and in front below the meatus urinarius; then they surround the mouth of the urethra and extend upward to the base of the clitoris. The circular part of the whole structure around the opening of the urethra represents the "urethral hymen" and appears sometimes as a membrane which may partially or even totally cover the meatus urinarius. While Pozzi thus ascribes a common origin to both the hymen proper and the urethral hymen, I draw from the facts pointed out by Dr. Dickinson the conclusion that this urethral hymen is but a pathologic structure due to conditions arising after birth. There are other arguments against Pozzi's theory. In a case of persisting sinus urogenitalis reported by Kelly in his *Operative Gynecology* no hymen was found. I myself had an opportunity to examine seven fetal hymens in microscopic sections and not in a single instance did I find a structural relationship between the hymen proper and the "urethral hymen." The microscopic pictures clearly demonstrated that the hymeneal tissue is derived from the vagina. The connective-tissue fibers of the vagina run in a direct line straight to the tip of the hymen and are more compact than the loose connective tissue of the vulva. Only at the sulcus nymphohymenalis, a few semicircular fibers form a connection between the two tissues. In conclusion, I should say that the "urethral hymen" is embryologically an entirely different structure from the hymen proper.

Dr. Dickinson.—I take flat issue with Dr. Watkins regarding the matter of urethral labia. I will say, too, that I have never seen urethral labia of the shape Dr. Kelly gives them. Of course, there are a variety of shapes. They become part

of the hymen behind. Here is the urethral opening (referring to drawing), and here is the opening through the hymen (indicating), and the two are invariably connected. There are a few instances in which a tear through the hymen has separated them. In all others the connection is present. I recall one case of hymen as a tab attached to and hanging from the urethral labia.

I have found two tabs in front of the vaginal opening running up to the urethral tab.

I did not lay great stress on incontinence. It is irritability of the bladder with which these troubles at the meatus are connected. Dr. Watkins evidently is not familiar with Skene's work. Skene always obliterated these urethral glands.

As to the subject of whether hypertrophies of the labia minora and the other changes which I have carefully specified are pathologic and due to friction and traction, it is too large to be entered upon here. It will take a dozen years for the ideas on this subject to percolate.

As to the other treatments necessary for irritable conditions about the meatus, it goes without saying in this company that all medicinal and hygienic measures should be tried before operative measures are undertaken.

Senile cystitis has been spoken of. Atrophy of the labia majora allows the meatus to protrude and to become infected. The meatus of the old woman sticks out and is constantly reinfected. While we are speaking of operations for incontinence and prolapse of the urethra, I would object to an operation of the kind Dr. Kelly described as being unnecessarily radical and involving a large amount of dissection, when much quicker and equally as good results can be obtained by ventrofixation of the bladder. I have hung up the bladder in fully twenty cases, and the results have been astonishingly good. Ventrofixation of the bladder can be done in women of sixty. In old women we have most trouble with prolapsed irritable bladders. Prolapse of the bladder can only be studied with the patient in the standing position, and so cases that are suitable for ventrofixation can only be picked after examining in the standing position.

In reference to the remarks made by Dr. Gellhorn, the theory of Pozzi seems to be the clearest of all of them, and yet it does

not apply to all cases. It seems to explain the hypertrophy or tab that is always connected with the hymen itself.

Dr. Van de Warker.—Incidentally in my paper, which I am sorry to say I did not have the opportunity of reading in full, I referred to the importance of these urethral hymens, so-called, which I simply called tabs.

I do not agree with any of the gentlemen who have spoken in regard to some points. In the first place, if you will examine the urinary opening or meatus of an infant girl you will find it distinct and coming together, constituting a different picture from the urinary meatus of the boy. It begins back clear to the beginning when these parts begin to assume their relative anatomic importance. While I will not say that they are congenital, they are closely postcongenital and belong to the early developmental anatomic period, the period of plasticity. I regard them as simply subsidiary.

Dr. Dickinson, in speaking of types, said that he never saw two alike. Their variety is simply infinite. Some are sessile, others bifurcated, and sometimes they run together. In other instances they begin at the upper margin of the meatus and drop down over it. Sometimes they begin in the lower margin. I believe we should eliminate the theory of their origin from vice. We should regard them as sanitary. The urethral opening of a woman is greatly exposed to infection. Simply a little fold of the inner labia protects it. Outside of that the meatus of a woman has an external part, and if constructed on the basis of an open meatus it would be constantly exposed to external infections. These tabs drop over and close it, except when the part is engaged in functional use. We have an analogue of the same condition in the male in the majority of cases in the prepuce, closing and protecting the urinary tract from exterior infection. It is very extraordinary that this thing, which we have seen all our lives, has suddenly loomed into notoriety as something new, when it is as old as humanity itself.

I regret to say that the subject of stricture of the urethra in women was not touched upon, and as Dr. Kelly and I have some little matters to settle regarding that condition, as it was not brought up in this discussion, I do not think it is wise to make any allusion to it here.

THE TREATMENT OF GONORRHEA.

A Clinical Study.

By Henry T. Byford, M.D.,
Chicago.

That the treatment of gonorrhea is not satisfactory is proved by the fact that new remedies are constantly being sought for. No one kind of treatment is generally recognized as the best.

The purely expectant treatment has been followed by many from the earliest times without having been able to successfully recommend itself for general adoption. It is still employed, by some because it is free from many of the harmful results that have attended local treatment. Internal medication is more or less efficient for the urethritis, but it only modifies and shortens the course of the inflammation, and does not always prevent the sequelæ. In the male there is perhaps a chance for it, but as the urethra constitutes a very unimportant part of the vulnerable area in the female, it cannot be relied upon in gynecologic practice. Local medication has until recently been quite unsatisfactory. Astringent injections acted slowly, and in male urethritis were often followed by stricture, periurethral abscess, and the spread of the infection to the seminal ducts and bladder. In the female they did not reach the deeper parts nor prevent the spread of the disease. The injection of the silver salts has not yet done what was expected. The most efficient ones are, I believe, those that are irritating, and which, therefore, have the same objectionable qualities

as the astringents formerly employed. The non-irritating silver salts are less efficient and are slow in action unless they are used with such frequency that, aided by the frequent passage of the urine, they keep the germs pretty nearly all washed out, and thus act by cleansing the urethra rather than by promptly killing the gonococci.

The desiderata are a remedy that will rapidly destroy or remove the germs without doing injury to the protective epithelium and a method of application that will not carry the germs to the deeper portions of the genitourinary tract. Practically it is necessary that the patient should be able to carry out the treatment at home.

Since the gonococcus is not an excessively virulent germ and rapidly perishes when deprived of favorable conditions for its development, these desiderata ought to be obtainable.

A few years ago prolonged irrigation of the male urethra with hot water was found efficient, but proved to be a practical failure, because of the difficulty of carrying it out properly. The surgeon had to personally give all of the treatments, and could not or did not always give them often enough. Besides, it was quite difficult for a surgeon to administer the prolonged irrigations properly, for they took up a great deal of his time. I was surprised at the good results reported, and considered that it effected the ideal cure. And it occurred to me that the same kind of a cure might be affected by washing out the urethra with a small syringe used by the patient. Such large quantities of water could not be used, but the urethra could be continuously washed out thoroughly for as long a time or longer, and, what was a distinct advantage, the patient could repeat the washing out much more frequently than would be possible by the medical attendant at his office. In fact, it could be repeated so often and so thoroughly that the pus and germs would be practically all washed out, and the treatment could be repeated before they had reaccumulated sufficiently to

invade new areas. This I considered all the more practicable, because the epithelial cells would not be destroyed or injured.

Reasoning thus, I felt that if a treatment was commenced soon after an infective coitus, and continued for two or three days, the disease could be aborted, and if begun later it would immediately arrest the progress of the infection along the genital canal and rapidly eradicate it from the area already affected. As I was at that time engaged in general practice, I found a few opportunities to try it on the male. My experience, however, has only been with arresting the progress and rapidly curing the infection. I have had no experience in aborting it. My first patient came to me the day after the appearance of the discharge. I provided him with a glass ear syringe, the nozzle of which was enlarged near the point, and showed him how he should compress the urethra firmly with the thumb and forefinger of his left hand as far back as the pubic bones would allow, and then inject water as hot as could be borne until the distal end of the urethra to the point of compression was distended. I had him hold the water in by keeping the nozzle against the urethral orifice for about half a minute. The water was then allowed to run out, and still hotter water immediately injected. This maneuver was repeated for ten minutes. He was directed to employ this treatment every two hours by day and once during the night. He was advised to continue the injections twenty minutes each time when possible. The young man was not employed and had access to running hot water at home, and carried out the treatment quite faithfully. The result was surprising. After a few days the discharge became mucous and only showed itself in minute quantities after the four hours' interval between injections. During the second week the discharge disappeared entirely. After that the injections were used five or six times daily for another two weeks, but not at all during the night. I directed him to drink all the water he could and to urinate frequently.

By drinking before going to bed he was always awakened for treatment during the night by a desire to urinate.

One drawback to this treatment of male urethritis is that men cannot always give up the time and cannot always get the hot water. In such cases I have directed them to wash out the urethra with plain cold water then inject a mixture of equal parts of hydrogen dioxide and either warm or cold water five or six times and hold it in place a minute each time. The deeper part of the urethra is, of course, kept shut off by firm compression between the thumb and forefinger, as already described. As an unnecessary but perhaps beneficial adjuvant, the patient may inject a 5 or 10 per cent. solution of argyrol or protargol. I attach greater importance to the thorough washing out of the pus and germs than to the disinfection, for what the dioxide does not remove the silver probably does not reach. Whenever germicides are used they should be entirely unirritating, for the mucosa becomes very sensitive after so much bathing in warm water. By carrying a small bottle of diluted dioxide and another of the silver salt solution a man can treat himself at his place of business, the treatments being made in such a case upon arising and after breakfast at home, in the middle of the forenoon, at noon, in the middle of the afternoon, and about 6 P.M. at his place of business, and after dinner, at bedtime, and once in the night at home. With treatments made in this way the discharge has rapidly diminished so that it was generally unnoticeable after two weeks. The cure is quick in proportion to the frequency and duration of the treatments.

I have not tried this method in the male after the injection had spread to the deeper portions of the urethra. When it has gone that far I think that frequent deep injections of a 1:500 solution of alphozone would act much more efficiently than the ordinary germicides. I have related this experience with gonorrheal urethritis in the male because the possibility of isolating the distal end of the urethra and of watching the discharge gave a more perfect demonstration

of the efficiency of the method than would be possible in female cases.

I do not depend upon local medication for the treatment of gonorrheal urethritis in the female, because the patient cannot properly use urethral injections, and because the urethritis recovers quite satisfactorily without urethral injections. In order, however, to prevent the spread of the infection to the glands about the urethral orifice as well as other parts of the vulva, I order hot sitz baths every two hours by day, lasting from ten to twenty minutes, and if practicable once during the night. If the vulva has been producing a discharge for three or four days I order a copious hot vaginal douche after each sitz bath. The vulva should be thoroughly washed off after each urination. If the urethra is not affected the sitz baths can be omitted and the douches be kept up for twenty minutes at a time. After two weeks every four hours during the daytime is often enough for the douches or sitz baths. After this three times in twenty-four hours, and after four weeks twice. There need be no fear of carrying germs to the deeper parts with the syringe, for the douche is so copious and prolonged that they would be washed out again. I have cured cases in this way time and again without observing any sequelæ, and have cured them in this way after they had been treated unsuccessfully by the ordinary methods.

When the cervical endometrium is infected I do not think that local applications of germicides penetrate the mucous glands, and hence do not employ them. I depend upon the frequent prolonged vaginal douche of water as hot as can be borne to relax the external os uteri and the mouths of the mucous glands, and to wash out the pus and germs as well as to affect them deleteriously by the high temperature. When the corporal endometrium is infected I see to it that the internal os is sufficiently dilated for free drainage, and depend upon the hot vaginal injections. The same treatment is used palliatively for gonorrheal salpingitis, except,

of course, that the patient is kept in bed until the acute symptoms have subsided.

According to my experience, gonorrhea should always be promptly treated, but never be overtreated, and I believe that hot sitz baths and hot douches with internal treatment perhaps for the urethritis is all that is called for in the average case; but this treatment must be carried out faithfully and thoroughly. I prefer plain water to the normal salt solution or mild astringent or antiseptics, for it can be used hotter and more copiously, and because I think that plain water by a sort of osmotic action tends to draw out the mucus and pus or other material upon which the germs feed as well as the germs themselves.

Since the discovery of the efficiency of alphozone as a destroyer of germs and of their culture media I have come to the conclusion that the injection of an ounce or more of the 1:500 solution directly after each douche, the patient taking the dorsal recumbent posture and retaining it as long as possible would materially hasten the cure and lessen the danger of infection of the cervical endometrium.

The advantages of this treatment when used early may be summed up as follows:

1. It prevents the spread of the disease to adjacent parts.

2. It does not injure the epithelial covering, and thus it tends to limit the infection to the superficial areas.

3. It removes more germs and pus cells than either astringents or disinfectants can destroy. It acts in the same way as constant irrigation both in aborting and arresting the progress of the infection.

4. It can be used more frequently than astringents or strong germicides, so that the parts can practically be kept free of pus and germs all of the time, while the method of using germicides and astringents three or four times daily allows the germs and pus to accumulate and spread between injections.

5. In the male, and possibly in the female, peroxide injec-

tions may be substituted when the time and facilities for the hot-water treatment cannot be had. When the discharge has become scanty and the injections cannot readily be used so frequently a non-irritating solution of a silver salt can follow each hot-water or peroxide treatment.

6. It may be used in connection with alphozone injections for the dissolving of germs and culture material not eliminated by the douches.

7. It possesses all the advantages of the expectant treatment, viz., it does no harm. It can be combined with the internal or local medication when it becomes impossible to carry it out with the necessary time-consuming detail. It exemplifies the superiority of asepsis to antisepsis.

THE RELATION OF THE APPENDIX TO PELVIC DISEASE, BASED UPON A CLINICAL AND MICROSCOPIC STUDY OF TWO HUNDRED CASES.

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Combined operations may be said to be the order of the day. Not only is the gynecologist called upon to operate upon more than one portion of the generative tract at one sitting, but he is also expected to ascertain the condition of various other abdominal organs when the abdomen is opened for the treatment of pelvic disease. How much shall be done outside of the pelvic cavity during one operation will depend largely upon the number and kind of lesions present and the general condition of the patient. When there is a history of attacks of abdominal and pelvic pain, and exploration through the suprapubic incision has shown the gall-bladder filled with stones, obviously cholecystotomy and removal of the stones are called for at the same operation unless the general condition of the patient is a contraindication to the prolongation of the operation. In this manner will the patient be saved the discomfort and expense of a second operation.

The same line of reasoning may be applied to the appendix. Unless there be contraindications, everyone, I think, will agree that this organ, if diseased, should be removed whenever the abdomen is opened for other abdominal and pelvic disease. The question then turns upon the ability of

the surgeon to determine by inspection and palpation if a given appendix be diseased. If the organ be enlarged, attached to diseased appendages or show other gross evidences of departure from normal, there arises no question as to the desirability of its removal. But is the appendix, which is free from adhesions, which is not constricted or angulated, to be considered a normal organ? Are the appendices which are free from adhesions, but are constricted at one or more places, diseased? In other words, can we, from macroscopic appearances alone, say whether an appendix is or is not diseased? Obviously, this can only be determined by carefully noting the gross appearances of the organ in a series of cases where the abdomen has been opened for other purposes, subjecting these appendices to careful microscopic examination, and then combining microscopic with the clinical findings. If appendices presenting certain appearances be found in the majority of cases to be normal, while the contrary is proved to be the case in other appendices, the surgeon would soon have in his possession certain facts from which could be deduced rules which would govern his procedure at a given operation. Certain appendices he would remove, because both macroscopically and microscopically he has found them to be diseased. On the other hand, if appendices, to all appearances normal at the operation, were shown microscopically to be diseased, and *vice versa*, the operator would be obliged to dispense with rules, and in case of a certain proportion of the appendices being proved by the microscope to be abnormal he would be forced either to close the abdomen, with the knowledge that he was leaving behind a certain percentage of diseased appendices, or he would be driven to remove every appendix irrespective of its physical appearance. Especially would he choose the latter course if his clinical experience had convinced him that often his patients suffered from a diseased appendix after the surgical cure of their pelvic lesions.

In 1893 my attention was called to the importance of a

careful examination of the appendix when the abdomen was opened for pelvic disease. In that year I operated upon a single woman, aged thirty-two years, who for two years had suffered from dysmenorrhea and pelvic pain. The appendages were not enlarged, but were extremely tender, and, as there were no evidences of endometrial disease, they were supposed to be the cause of the pain. Section, however, showed the pelvic organs normal. The appendix was found unusually long and club-shaped. Its removal resulted in a cessation of the attacks of pain and a complete recovery.

Since this case I have made it a rule to examine the appendix whenever I was not completely satisfied that the patient's symptoms could be explained by the existing pelvic lesions. Like many another operator, however, I failed to record accurately my observations until some two years ago. Then, with the view of throwing some light upon the question considered above, I began systematically to remove the appendix in every case where the abdomen was opened for other purposes, unless, in my opinion, the patient's chances of recovery were jeopardized by the additional five minutes' time required for the removal. Each appendix thus removed was subjected to careful microscopic examination by Dr. R. L. Morse, pathologist of the gynecologic service of the Hospital of the University of Michigan. His work in turn was supervised and his results verified in each case by Professor A. S. Warthin, director of the pathologic laboratories of the University of Michigan.

In June, 1902, I presented before the Michigan State Medical Society[14] a preliminary report of the microscopic findings in thirty-four removed appendices, together with certain clinical data relating to these same cases. At that time I purposely refrained from drawing any extensive conclusions, as I wished to study still further this important subject. Since that report I have removed and studied the appendix in 166 additional cases. I have deemed it wise to consider these cases together, since the second classification

differs materially from the one adopted in the preliminary report. I have included thirty of my private cases in this list, as the same care was used in the examination of these appendices as with the University Hospital cases.

Certain statements made in the first report apply equally well to this one, viz.: "The clinical material at the disposal of the department was as purely gynecologic as it could be made prior to the opening of the abdomen. Whenever it was suspected that the primary focus was situated in the appendix, the case was referred to the surgical clinic. Hence, to the gynecologist, the cases are of more value in showing the relationship between appendicial and pelvic disease than if the doubtful cases had been included."

It has been the aim to conduct these investigations with a perfectly unbiased mind. No attempt has been made to prove any particular proposition by means of statistics. During the course of the study it became evident that a microscopic classification, admirable no doubt from a pathologic standpoint, was not at all serviceable in combination with clinical data. The classification finally adopted apparently meets all needs. With this microscopic classification clearly in mind, and with the clinical data in addition, it is hoped that the conclusions arrived at will be of real value to the surgeon.

According to the microscopic findings, the 260 appendices may be divided into:

1. *Negative.* Comprising those cases showing no changes in the mucosa, submucosa, muscularis, or subserosa, or upon the peritoneum when compared with appendices taken as the normal standard and obtained from individuals without history of appendicitis and presenting none of the characteristics described below.

2. *Chronic Inflammation.* Comprising those appendices presenting evidences of active catarrhal inflammation or ulceration of the mucosa, with atrophy of the mucosa and lymphadenoid tissue or muscularis associated with fibroblastic proliferation or formation of scar tissue.

3. *Doubtful Significance.* Including appendices characterized by hyperplasia of the lymphadenoid tissue, dilatation or constriction of the lumen, hyperplasia of the connective tissue in the submucosa, local or general atrophy of the muscular coat, unattended by conclusive evidences of inflammation, the significance of these changes being unknown.

4. *Former Inflammation.* Comprising those cases showing partial or complete obliteration of the lumen, formation of scar tissue in the mucosa and submucosa, lymphadenoid tissue, and muscularis without active signs of inflammation.

5. *Acute Inflammation.* Including those cases showing active catarrhal or ulcerative inflammation without fibroblastic proliferation or formation of scar tissue, or atrophy of the different layers of the wall of the appendix.

6. *Periappendicial Inflammation.* Including those cases showing a purulent inflammation of the subserosa, mesoappendix, or muscularis, with the mucosa unchanged or secondarily involved.

Microscopically the 200 cases can be arranged in the six groups as follows:

1. Negative, 65 cases, 32.5 per cent.
2. Chronic inflammation, 57 cases, 28.5 per cent.
3. Doubtful significance, 41 cases, 20.5 per cent.
4. Former inflammation, 28 cases, 14 per cent.
5. Acute inflammation, 6 cases, 3 per cent.
6. Periappendicial inflammation, 3 cases, 1.5 per cent.

Total, 200 cases, 100 per cent.

It may be well to state in this connection that Dr. Warthin has ever had in mind in his examination of each appendix the main object of the investigation, and, whenever there has been a doubt regarding the abnormality of the specimen, it has been placed in a class by itself. This is of importance, for it does away with the criticism that a pathologist can always find something wrong with a specimen. Combining cases of "doubtful significance" (41) with the negative or normal cases (65), we have 106 cases, or 53 per cent., show-

ing practically no evidence of disease, while 94, or 47 per cent., of the appendices removed during the course of the sections for other purposes were diseased. As would be expected, the kind and extent of the disease varied in the different specimens from acute inflammation to where the disease had ceased to be active, and was recognizable only by scar tissue, the result of former inflammation.

These figures are definite and conclusive as regards the condition of the appendix as shown by the microscope in 200 appendices removed incidentally in the course of as many operations for various pelvic lesions. The operator is not obliged to state his impressions of how often in sections of this kind the appendix will be found diseased. Such "impressions," although stated positively in medical society discussions, carry but little conviction with them, no matter how accurate may be the observer. For, as we shall show later, it is impossible for anyone to judge of the abnormalities of the appendix by its macroscopic appearances.

There were only 3 cases showing periappendicial inflammation alone. There were, however, 12 additional cases, which were secondarily periappendicial, although their chief characteristics placed them in other groups.

In the chronic inflammatory class there were 8 cases, or 14 per cent., which could be designated as ulcerative. In 29, or 50.87 per cent., there was an obliteration of the lumen of the appendix. This obliteration varied in position and degree. At times it was at the tip, at other times at some other portion of the tube.

In the periappendicial class there were 2 cases of tuberlosis and 1 of primary carcinoma of the appendix. The latter rare condition will be considered later.

Clinically, the 200 cases have been tabulated under different headings, according to age, social state, dysmenorrhea, abdominal pain which might have been due to a diseased appendix, and according to the disease for which the primary operation was performed. In addition, the observa-

tions made at the time of operation regarding the shape, length, and condition of the appendix as regards adhesions have been carefully collected and tabulated in reference to the microscopic findings. It is not always possible, either in hospital or private practice, to secure histories of value for statistic purposes, but at least the attempt has been made in the 200 cases.

Social State. This can have but slight bearing upon the relation of the appendix to pelvic disease, except as it shows the nature of the clinical material from which the statistics have been made. Of the 200 patients, 157 were married, 31 were single, and 12 were widows.

Age of Patients and Length of Appendix. Ribbert[16] has noted the length of the appendix in 400 postmortem cases during the decades of life from ten to sixty years. He finds that the appendix reaches its maximum length between the tenth and thirtieth years. It gradually becomes smaller during the decades between thirty and sixty years.

Ribbert's Tables. (400 Cases.)		Author's Tables. (107 Cases.)	
	Length.		*Length.*
10–20 years	9.75 c.m.		
20–30 years	9.5 c.m.	20–30 years	10.5 c.m.
30–40 years	8.75 c.m.	30–40 years	8.1 c.m.
40–60 years	8.5 c.m.	40–60 years	9.0 c.m.

The length of the appendix was carefully determined in 107 cases at the time of the operation. The method adopted was to ascertain the exact length by means of an aseptic graduated aluminum rule after the mesentery had been tied and cut. It was found impossible to record the exact length by any other method when the appendix was curved or bent upon itself. Shrinkage of the appendix after its removal renders laboratory measurements far from accurate, especially if the stump method of removal has been employed.

The average length of the appendix in 107 cases was 8.5 cm. This agrees very nearly with the measurements of other

observers. In Ribbert's 400 cases the average length was 8.25 cm. The longest appendix was 20 cm., the shortest 3.75 cm. Recently, however, I discovered in the routine examination of the appendix in a non-inflammatory case an appendix measuring only 1 cm. in length. There were no adhesions around this diminutive organ or any evidence that it had been amputated. Arranging the 107 patients into decades according to ages and comparing the average length of the appendices during these various decades, we see that the maximum length is reached up to the age of thirty, 10.5 cm. This agrees with Ribbert's findings. There is a decrease in length in the next decade, to be followed by an increase in the last two decades, contrary to Ribbert's statistics, where the average length decreases during each decade.

Arranging those with diseased appendices according to decades, and comparing these with the corresponding decades of those whose appendices were normal, we see that the length of the appendix in the normal group decreases as the age of the patients increase, while in the inflammatory cases the change in the length corresponds to that recorded above, viz., a maximum length between twenty and thirty years, a decrease in the next, and an increase in the next two decades.

It is possible, nay, even probable, that inflammatory changes play an important role in determining the length of the appendix. It may be inflammation in some cases (nearly 50 per cent.), rather than atrophic changes due to old age, which causes a decrease in length as the age increases.

Length of appendix in 107 cases arranged according to groups and decades:

Normal Cases (60).		Inflammatory Cases (47).	
	Length.		*Length.*
20–30 years	10.3 c m.	20–30 years	9.4 c.m.
30–40 years	9.3 c.m.	30–40 years	6.8 c.m.
40–60 years	9.1 c.m.	40–60 years	9.0 c.m.

Dysmenorrhea. McLaren[12] has called attention to the unsatisfactory results sometimes following ordinary surgical

treatment for supposed cases of obstructive dysmenorrhea, and suggests that some of these cases may be explained by the presence of an inflamed appendix, which manifests itself by attacks of colic during the menstrual period. He cites a number of illustrative cases. Other gynecologists have advanced the same idea. Recently, Guinard[8] has called attention to attacks of pain in the female which he designates as appendicalgia. Pain is the most prominent symptom, while the actual change in the appendix may be very slight. In the opinion of this writer also, in many cases of so-called dysmenorrhea, the fault may not lie in the uterus or appendages, but in the appendix. My own experience and reasoning lead me to the same conclusion, so much so that I continually bear this cause in mind in the consideration of the etiology of dysmenorrhea, especially in young single women whose pelvic organs seem fairly normal. As having a possible bearing on this question, I have noted the presence or absence of pain at the menstrual period in all of the 200 cases. Of course, the word dysmenorrhea is a relative one and must be defined nearly every time it is used. Where there was but slight pain, unaccompanied by clots, I have classed it as absent. It must be remembered, also, that in nearly all of the 200 cases the abdomen was opened for marked pelvic disease, which in itself accounted for most of the painful periods. We find, however, that when the appendix is the seat of chronic inflammation the proportion of cases having painful menstruation is greater than in those cases where the appendix was found normal. In the former group the percentage was 41.8, and in the latter 36.9.

This brief consideration of a diseased appendix as a causative factor in the production of dysmenorrhea is unsatisfactory. So many factors may be present, any one of which may be responsible for a large part of the dysmenorrhea in a given case, that the question must be, by its very nature, hard to solve. But that an appendix, the seat of chronic inflammation, can manifest itself at the menstrual period

by a sharp attack of abdominal pain, I am thoroughly convinced.

History of Appendicitis. It must be remembered that the cases under consideration were strictly gynecologic cases. The chief disease demanding operative treatment was supposed to originate, in every case, in the pelvis. The decision was arrived at after a careful consideration of the history and the pelvic findings. While in quite a proportion of the cases the involvement of the appendix was suspected, it was judged to be secondary to and of less importance than the pelvic lesions. We know now, what was not the case in the first consideration of appendicitis, that nearly as many women are attacked by the disease as men. Einhorn[7] shows that of 18,000 autopsies performed at the Pathological Institute at Munich from 1854, in 0.55 per cent. there was perforative appendicitis in males, while the percentage in females was 0.57 per cent. Again, Krüger[11] states that in Sonnenburg's clinic, in the seven years previous to 1897, out of 209 cases of appendicitis, 127, or 59 per cent., were men, while 41 per cent. were women. Or, take such a clinic as Ochsner's[13] at the Augustana Hospital, of 90 patients suffering primarily from appendicitis, 39 were males and 51 were females. This may be from the peculiar nature of the clinic, but it is significant as showing the proportion of males attacked by this disease is not so greatly, if any, in excess of the females.

The gynecologic service at the University Hospital is made up of material rich in new growths and chronic pelvic inflammatory lesions. Acute inflammatory cases do not predominate, as is the case where the material is supplied from the poorer districts of a large metropolis. Hence, in one way, diagnosis is easier than when called upon to differentiate between appendicitis and pelvic exudates. To quote Ochsner again, besides the 90 cases treated in one year at his clinic, there were 13 cases in which the primary disease was in the adnexa, or both appendix and tubes were so extensively

implicated that it was impossible to determine the primary seat of the inflammation.

An analysis of the 200 cases in reference to the history of possible appendicial pain shows that such pain was present in 45 per cent. of the cases where the microscope showed the appendix was or had been diseased. Such pain was present in only 33 per cent. of patients whose appendices were subsequently shown to be normal. Of course, this is reasoning backward, and is of value only as showing that a more careful consideration of the location, periodicity, and kind of pain in pelvic disease may give us a clue to coexisting involvement of the appendix. As before stated, patients giving a distinct history of appendicitis would have been referred to the surgical service. These figures simply mean that in 45 per cent. of the cases the pain, by its location and other characteristics, was such as might have led to a suspicion of possible coexisting appendicitis, if it were possible to differentiate between pelvic pain and that originating from a subacute or chronic appendicitis.

Appendicial Adhesions. It is much easier to determine whether the appendix be free or buried in adhesions than it is to decide some of the questions just under consideration. Accurate observations were made as to adhesions in 146 of the 200 cases. The appendix was adherent twenty-seven times, or in 18.5 per cent. Adhesions were twice as frequent in those cases where examination showed past or present disease as in those cases where the appendices were found normal. It is worthy of note, however, that in 6.1 per cent. of the normal cases adhesions were present.

Shape of the Appendix. The shape of the appendix was noted as being abnormal in 52 out of the 200 cases, or 26 per cent. These abnormalities have been arranged in a table according to the divisions already referred to:

TABLE SHOWING ABNORMALITIES IN SHAPE OF APPENDIX IN 52 CASES.

Class.	Total No. of cases.	Club-shaped.	Per cent.	Con-stricted.	Per cent.	Bent on itself.	Per cent.
1. Negative	65	7	10.7	6	9.2	6	9.2
2. Chronic inflammation	57	2	3.43	7	12.3	9	15.8
3. Doubtful significance.	41	6	14.6	1	2.3	3	7.3
4. Former inflammation	28	1	3.5	3	10.7	4	14.3

Cases of acute periappendicial inflammation were omitted because the small number interfered with the averages. A study of this table reveals a number of significant facts. In the first place, it clearly demonstrates that mere shape of the appendix cannot serve as an index of its normality or disease. Out of the 52 cases the appendix was noted as abnormal in shape twenty-seven times where the microscopic findings showed no disease. The appendix was noted as being club-shaped in 13 cases, yet subsequent investigation showed no disease. In 25 cases, however, where the shape of the appendix was noted as abnormal, different degrees of inflammation were found on microscopic examination.

Such findings as these must at least throw some doubt upon the correctness of the assertions of those who claim to be able to tell whether the appendix be diseased by its mere shape.

Fecal Concretions. Fecal concretions were noted twelve times out of 146 observations, or 8 per cent. This does not include fecal concretions as revealed by the microscope. Such concretions are of microscopic interest only, and are of no value clinically. The twelve concretions referred to were palpable, and could be taken into account in deciding whether to leave or remove the appendix. No other foreign bodies were found in this series of cases. Ribbert found 10 per cent. of fecal concretions in his 400 cases. They were slightly more common in men than in women, 10.5 being noted in the former and 9 per cent. in the latter. Kelly[10] quotes

Robert Abbe as being of the opinion that the perfectly normal appendix never contains fecal concretions. This statement is not borne out by the results of microscopic examination of the cases referred to. Out of the 12 cases showing fecal concretions, 4 showed inflammatory changes, while 8 were normal. This shows conclusively that the presence or absence of fecal concretions cannot be taken as a criterion of a diseased appendix. The removal of an appendix containing one or more concretions on the ground that their presence is a source of danger and renders the appendix more liable to disease is, on the other hand, logical, and seems to be supported by abundant clinical evidence.

Pelvic Pathology and the Condition of the Appendix. The 200 cases which have been used as the basis for this investigation were not selected ones. They represent the ordinary cases which the gynecologist is called upon to treat, with the possible exception of being more purely gynecologic on account of the rules under which the patients were assigned to the two services.

While the various lesions for which the 200 laparotomies were performed have all been carefully tabulated, only illustrative groups in their relations to the gross and microscopic condition of the appendix will be considered.

Chronic Disease of the Appendages. In this group have been placed all cases where the appendages were the subject of chronic inflammation. It includes degenerative changes in the tubes and ovaries as well as active inflammatory processes. In some there were slight, in others dense, adhesions binding down the appendages and uterus to the pelvic floor or coils of intestines. Other cases, however, were free from adhesions, the operation being performed for degenerative changes in the ovaries with or without retrodisplacement of the uterus.

Of the 106 cases of chronic disease of the appendages, 62, or 58.4 per cent., were accompanied by normal appendices, while 44, or 41.5 per cent., showed past or present changes in

the organ. As regards the side affected it may be noted that the disease was confined to the right side of the pelvis in 8 cases, to the left side in 6 cases, while both sides were affected in 30 cases.

The frequency with which the appendix is diseased in inflammatory pelvic affections of the right side has been dwelt upon by numerous observers. MacLaren's[12] experience is notable. He had 58 cases of inflammatory disease of the appendages out of 200 laparotomies. In 20 of these cases the appendix showed enough evidence of disease to require its removal. The appendix may be infected from its contiguity to the appendages, usually the right, at times the left. Infection may travel to the appendix from the appendages, or *vice versa*, by way of the appendiculo-ovarian ligament, a peritoneal fold joining the right ovary to the appendix, as was first pointed out by Clado, and since verified by numerous observers.

Contiguity. It is not uncommon to meet with the normal or abnormal appendix situated within the pelvis. It may or may not be adherent to the appendages of the right or left side, according to the inflammatory conditions present. While the appendix is more liable to come in contact with the appendages of the right side, it is perfectly possible, as I have demonstrated many times, in the presence of enteroptosis, or with a very movable cecum, for the appendix to rest upon the left tube or ovary. The appendix lies within the pelvis in a considerable proportion of cases. I have recorded it as within the pelvis in many of the cases where changes were found in the appendix. I am now noting its exact location, whether adherent or not, and it is surprising the number of times it lies within the pelvis. Poncet and Dormoy,[15] in order to suggest a rational treatment of certain forms of appendicitis through the rectum or vagina, have adopted pelvic as a distinct classification. Kelly[10] makes it a rule to remove long, free appendices in all right-sided pelvic operations. It would seem more logical to remove such

appendices, no matter what part of the pelvis has been operated upon, since such free appendices can become adherent to any part of the pelvis.

Interesting in this connection are the gross appearances of the appendix noted at the time of the operation. These have been arranged in the form of a table, and are of value in the way of comparison. It will be noted that in the inflammatory group (44 cases) there were 18 cases, or 40.9 per cent., of adhesions, while in the negative group there were only 11 adherent appendices, or 17.7 per cent. In the same way the inflammatory group showed 14 cases, or 31.8 per cent., of constrictions, while there were only 11 per cent. of constrictions in the negative group. On the other hand, there were more club-shaped appendices and fecal concretions in the negative than in the inflammatory group. This proves that even in chronic disease of the adnexa, where the appendix is more liable to be diseased, the mere gross appearance of the organ is no safe guide for its removal. Adhesions of the appendix to adjacent organs, even to the appendages, constrictions of its lumen, fecal concretions, and a marked relative increase in the size of its distal end, does not necessarily denote that the appendix is diseased.

TABLE SHOWING CONDITIONS OF APPENDIX IN 106 CASES OF CHRONIC DISEASE OF THE APPENDAGES.

	Total.	Per cent.	Adhesions	Per cent.	Club-shaped.	Per cent.	Constrictions.	Per cent.	Fecal concretions.	Per cent.
Negative group	62	58.4	11	17.7	5	8.1	7	11.0	6	9.6
Inflammatory group.	44	41.5	18	40.9	2	4.5	14	31.8	3	6.8

In one of my cases the appendix was removed unwittingly. A right-sided ectopic gestation sac was removed through a posterior vaginal incision. A careful examination of the specimen at the laboratory showed that the adherent and diseased appendix also had been removed. A moment's

consideration will convince one that such an appendectomy must be of the crudest kind, and is an argument against the pelvic route for the treatment of pelvic lesions. Had the abdominal route been employed, not only could the ectopic sac have been more easily dealt with, but the diseased appendix would have been discovered and removed in a surgical manner.

Uterine Fibromata. There were in all 26 of these growths, arranged in two groups according to the presence or absence of adhesions. There were 19 in the non-adherent class, while in 7 cases there were adhesions either of the appendages or some other portion of the growths. Nine of the patients with non-adherent tumors had normal appendices, while the remaining 10 showed inflammatory changes. Of the 7 patients with adherent fibromata, 4 had normal appendices, while in 3 inflammatory changes were present.

Of the entire number of patients with fibromata, 13, or 50 per cent., had normal appendices. Abnormalities in the gross appearance were noted in 4 cases, fecal concretions, adhesions, a constriction, and club-shaped being recorded in 1 case each. Of the 13 inflammatory appendices, 2 were adherent and 3 constricted. Hence, as far as the gross appearances were concerned, the appendices *appeared* diseased in only one less case in the negative than in the inflammatory group.

Ovarian Cystomata. The 200 cases included 24 ovarian cysts, varying in size from growths whose upper limits reached midway from the pubes to the umbilicus to very large tumors, reaching to the ensiform. In 17, or 70.9 per cent., of these cases, the accompanying appendices showed inflammatory changes, while in 7, or 29.1 per cent., the appendices were normal. Thus, the proportion of cases with diseased appendices is much larger than with fibroids. In 9 of the 17 cases abnormalities of the appendix were noted at the time of the operation—1 was club-shaped, 2 had fecal concretions, 2 were constricted, while 3 were adherent to the cyst

wall. Of the 7 negative appendices, 1 was bent upon itself and 2 were club-shaped. Thus, again, it can be seen that the mere gross appearance of the appendix is no criterion of the microscopic picture.

Various observers have called attention to the frequency with which the appendix may be attached to the wall of an ovarian cyst. Sutton[17] mentions this frequency, and claims that the adhesions often arise from inflammation of the appendix. He quotes Doran as having had 6 such cases. Such an adherent appendix may easily set up an inflammation of the cyst wall, and the infection even extend to the cyst contents, giving rise to a suppurating ovarian cyst. Chognon,[2] writing of the adhesions of the appendix to adjacent organs, collected from the literature 20 cases where it was adherent to ovarian cysts. My own statistics (3 out of 24 cases) would show it even more common. Its position in relation to the cyst wall is important. Not only can appendicitis result, but the cyst itself can be infected from the inflamed appendix.

TECHNIC OF APPENDECTOMY AS A CONCOMITANT TO OTHER PELVIC OPERATIONS.

Except in the case of the appendix accidentally removed through a vaginal incision for ectopic gestation, the appendices were all removed through the median abdominal incision. This is always made long enough to admit the operator's hand. So important do I consider the thorough exploration of the abdominal cavity when once the peritoneum is incised, that I have dispensed with the small median incision. If the pelvic disease be severe enough to necessitate a laparotomy, a thorough exploration of the abdominal cavity is also called for unless there be contraindications. Pus in the pelvis would contraindicate the passing of the hand upward to the diaphragm for fear of septic contamination. It would not, however, prevent an examination of

the appendix. On the other hand, the general condition of the patient may be such as to preclude any treatment except that directed toward the pelvic lesion. The appendix, with rare exceptions, due to an extremely short mesocecum or to adhesions, can be drawn to the median line with ease. The white band of the cecum serves as the best guide for the location of the latter. The hand is swept under the abdominal wall into the ileocecal fossa until the forefinger locates the band. The latter is then drawn into the incision and traced until the appendix is located. The appendix and cecum are then surrounded with gauze sponges to guard against possible fecal contamination, and the appendix removed, the stump being touched with pure carbolic acid and buried by a purse-string peritoneal suture.

The mortality attending the removal of appendices, the seat of chronic, not acute, inflammation should be *nil*. As far as could be ascertained in no one of the 200 cases was the mortality or even morbidity increased by the appendectomy.

Two years ago Howard Kelly[a] secured, through correspondence with seventy-four prominent surgeons in this country, their opinions as to the advisability of removing the apparently normal appendix when the abdomen was opened for other purposes. Their replies showed that a large majority were against the removal of the normal appendix simply because the opportunity arises to do so. An overwhelming majority, however, were in favor of the removal of the appendix when it deviates in the slightest degree from the normal. This last opinion was brought out by the question, whether the slightly adherent appendix, when the abdomen is opened for other purposes, should be removed. If the study detailed above has proved any one thing conclusively it is that adhesions of the appendix *do not* necessarily mean departure from the normal, viz., a diseased appendix as revealed by microscopic examination. While adhesions were twice as frequent in those cases where the appendices showed past or present inflammation, in 6.1 per

cent. of the normal appendices adhesions were recorded as being present. The same may be said of club-shaped and constricted appendices and those containing fecal concretions. In other words, the surgeon cannot tell in the class of work under discussion by gross appearances alone whether the appendix be or be not diseased. The surgeons quoted above would and do remove those appendices which they consider abnormal. They confess that the patient is much better off without the appendix if there be the slightest question of its being diseased. The reason they do not remove every appendix when the abdomen is opened for other purposes is because they feel that by inspection and palpation they can identify such a diseased appendix. I was of the same opinion before I began the above series of investigations. Now I am willing to confess to my inability to so determine.

I am convinced that in the past many of the failures to cure my patients, after subjecting them to various surgical procedures *via* the suprapubic incision, has been through neglect in not examining and removing the appendix. Appendicial disease need not find expression in every case in an acute attack. The chronic form of appendicitis with its rather frequent exacerbations gives rise to pain, tenderness, or at least to an uncomfortable feeling in the right lower abdomen. I believe in many cases after complete ablation of the uterus and appendages for purulent disease, the subsequent abdominal pain and tenderness are not so commonly dependent upon adhesions as has been supposed. Rather, in many cases it is due to the presence of a diseased appendix. I know that my symptomatic cures have increased since I began systematically to remove the appendix when the abdomen was opened for other purposes. This alone is enough to warrant my continuation of the practice.

As I stated at the outset of this paper, there may be contraindications to the removal of the appendix. However firmly the surgeon may believe it his duty to remove every appendix,

he would not prolong the operation for five minutes if thereby he would seriously jeopardize his patient's chance of recovery. Neither would he remove the uterus in a case of bilateral pus tubes, nor resect an ovary after removal of one pus tube, nor correct a retrodisplaced uterus in addition to other pelvic procedures, if thereby he thought he was diminishing his patient's chances of life. Yet rarely in his routine work does he have to decide against such additional procedures. I cannot see the force of the time argument against the removal of the appendix as applied to the large majority of cases. In my opinion, as before stated, the removal of the appendix as a concomitant operation when opening the abdomen for other purposes should not and does not in the hands of the trained surgeon add to the mortality of the abdominal section. Nor do I believe it prolongs the convalescence. These last two statements are individual opinions and possibly are of value merely as applied to my own work. But if they be universally true, the only reason for the non-removal of every appendix where no contraindications exist is eliminated, and the operator is logically compelled to remove the organ in every case. Otherwise, in nearly 50 per cent. of cases he will be leaving behind a diseased appendix. His operations will be incomplete, and his patients will suffer correspondingly.

Another argument in favor of removal of the appendix as a concomitant to pelvic operations by the abdominal route is the occasional presence of malignant disease of the appendix. The cases of primary carcinoma of the appendix are multiplying since the latter has been more systematically subjected to microscopic examination. Clark[4] has reported recently a case of primary carcinoma of the appendix in a series of 120 laparotomies for pelvic disease with coincident removal of the appendix. One year later there had been no return of the disease.

A. O. J. Kelly,[9] in 1900, reported three cases of primary carcinoma of the appendix in an examination of 706 appen-

dices removed by Deaver. There was a fourth case, but it may have been secondary to a carcinoma elsewhere in the body. In the 3 undoubted cases the tumors were of macroscopic size, and were not detected by the ordinary microscopic examination. In my case, also, the true nature of the disease was not discovered until the systematic laboratory examination had been made. Although removed nearly a year ago there has been no sign of a recurrence. Here are 5 cases of primary carcinoma of the appendix in 1026 appendectomies, all unrecognized macroscopically. All the appendices were removed so early that the chances of non-recurrence are very good.

Purposely I have passed over with few comments that portion of our subject which I believe has been settled beyond doubt.

Deaver, Ochsner, Kelly, and the testimony of other equally good surgeons have proved that the appendix often becomes diseased through its close proximity to diseased appendages and *vice versa*. Baldy[1] is of a different opinion, but his statements lack proof. Microscopic sections in quite a few of the 200 cases in my series showed progressive involvement of the different layers of the wall of the appendix, beginning with the serosa and working inward. As far as the surgeon is concerned, it is immaterial whether this is exactly the same kind of inflammation as that where the morbid process starts with the mucosa. Suffice it for him to know that the appendix is diseased and may give rise to symptoms in a certain proportion of the cases.

CONCLUSIONS.

1. Only a little over 50 per cent. of appendices removed during the course of operations for pelvic lesions will be found microscopically to be normal.

2. The remainder will show forms of acute and chronic inflammation or the result of former inflammation.

3. The average length of the appendix is between 8 and 9 cm. In 107 cases of the present series the average length was 8.25 cm.

4. The maximum length of the appendix is found between the ages of twenty and thirty years. After this period the average length of the appendix is less. While this diminution probably is in part due to normal atrophy, in a certain proportion of cases it is influenced by inflammatory changes.

5. Menstrual pain may be due to or enhanced by the presence of an inflamed appendix. The congestion incident to menstruation increases the inflammation and gives rise to attacks of appendicial colic.

6. It is exceedingly difficult to differentiate between pain due to pelvic lesions and pain due to chronic appendicitis. In the present series of cases a much larger proportion of patients whose appendices were abnormal gave histories of having or having had this pain of doubtful origin.

7. The appendix is adherent twice as frequently in those cases where microscopic examination shows past or present disease. A certain proportion of adherent appendices are, however, perfectly normal microscopically.

8. Mere shape of the appendix cannot serve as an index of its normality or disease. Appendices may be club-shaped, constricted, or bent upon themselves and yet be perfectly normal microscopically.

9. The appendix is the seat of fecal concretions in at least 8 per cent. of all cases. Their existence does not denote that the appendix is diseased.

10. Nearly 50 per cent. of patients with chronic disease of the appendages show accompanying disease of the appendix.

11. This inflammation may be the result of the direct contact of the appendix with diseased adnexa, or infection may travel from the latter to the appendix through the lymphatics connecting the two.

12. In chronic disease of the appendages adhesions of the accompanying appendices are present in nearly 50 per cent.

of the cases where microscopic examination shows the latter to be diseased. In a certain proportion of cases, however, although the appendix may be adherent, it is also perfectly normal.

13. In chronic disease of the appendages the appendix which is club-shaped, constricted, or contains fecal concretions is not necessarily diseased.

14. In 50 per cent. of patients with uterine fibromata there is accompanying disease of the appendix.

15. In 70.9 per cent. of patients with ovarian cystomata the accompanying appendices are diseased. The appendix is not infrequently adherent to an ovarian cyst, and may even infect the latter.

16. The ordinary median abdominal incision in the class of cases under consideration amply suffices for the removal of the appendix.

17. Such removal should neither increase the mortality nor prolong the convalescence.

18. Since it is impossible for the surgeon by gross appearances alone to determine which appendix is diseased, and since nearly 50 per cent. of appendices where the abdomen is opened for other purposes are found, microscopically, to be diseased, it is the surgeon's duty in the absence of contraindications to remove the appendix in every such case. Otherwise he will leave behind diseased appendices, which may prove a subsequent source of suffering to the patient.

19. Systematic examination of series of removed appendices show the occasional presence of primary carcinoma in such an early stage that it could not have been detected by inspection at the time of operation. Removal at this early stage means probably a non-recurrence and the saving of a life. Even were carcinoma of the appendix not commoner than once out of 200 abdominal sections it would still be an argument for the removal of the appendix in every case where the abdomen is opened for other purposes.

REFERENCES.

1. Baldy, J. M. Appendicitis: Its Relation to Pelvic Inflammations. American Medicine, 1904, vol. vii., p. 629

2. Chognon. Des adherences de l'appendice vermiculaire avec les organes avoisinants dans les operations intraabdominales. Lyon, 1894, No. 914.

3. Clado. Appendice Cecal. Comptes Rendus Société de Biologie. 1892, p. 133.

4. Clark, John G. Unsettled Questions in Abdominal Surgery. American Journal of Obstetrics, 1904, vol. xlix., p. 577.

5. Deaver, John B. Pus in the Pelvis Depending upon the Complicating Appendicial Disease in the Female; Methods of Treatment. American Medicine, 1902, vol. iv., p. 885.

6. Doran, Albert. Quoted by Sutton (17).

7. Einhorn, H. Ueber Perforationen des Processus vermiformis und des Coecums. Munchener medicinische Wochenschrift, 1891, Bd. xxxviii., S. 121, 140.

8. Guinard, A. Douleurs d'Origine appendiculaire. Bulletins et Mémoires de la Société de Chirurgie de Paris, January, 1904.

9. Kelly, A. O. J. Tumors of the Vermiform Appendix. University Medical Magazine, May, 1900.

10. Kelly, H. A. Under What Circumstances is it Advisable to Remove the Vermiform Appendix When the Abdomen is Opened for Other Reasons? Journal of the American Medical Association, 1902, vol. xxxix., p. 1019.

11. Kruger. Appendicitis und ihre Beziehungen zu den weiblichen Genitalorganen. Deutsche Zeitschrift für Chirurgie, 1897, vol. xlv., S. 401.

12. MacLaren, Archibald. The Relationship between Dysmenorrhea and Appendicitis. American Gynecological and Obstetrical Journal, 1900, vol. xvii., p. 14.

13. Ochsner, A. J. Appendicitis as a Cause of Inflammatory Disease of the Right Ovary and Tube. Journal American Medical Association, 1889, vol. xxxiii., p. 192.

14. Peterson, Reuben. Appendicitis and Pelvic Disease. American Gynecology, 1902, vol. i., No. 2.

15. Poncet et Dormoy. Quoted by H. P. Newman in Appendicitis from the Standpoint of the Gynecologist. Journal of the American Medical Association, 1903, vol. xli., p. 894.

16. Ribbert. Beiträge zur normalen und pathologischen Anatomie des Wurmfortsatzes. Archiv für pathologische Anatomie, 1893, Bd. cxxxii., S. 66.

17. Sutton. Surgical Diseases of the Ovaries and Fallopian Tubes. 1891, p. 127.

THE STREPTOCOCCUS IN GYNECOLOGIC SURGERY.

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Bacteriologists have still much to learn and teach us about the streptococcus, especially with reference to the differentiation of this organism into distinct species or varieties. Clinically, however, we know a good deal about this organism, and experience has taught us to regard its capacities for evil with respect not altogether unmingled with a wholesome dread. We know that the streptococcus in some form or other is the pathogenic agent in erysipelas, acute septicemia, the puerperal fevers, and postoperative peritonitides, and thus far researches have taught us to wonder not so much at the frequency, but rather at the relative infrequency, of acute processes due to the agency of the streptococcus pyogenes. Döderlein has shown that of the vaginal secretions taken from about 200 cases nearly 100 were found to be abnormal, and that 10 per cent. of these pathologic secretions contained the streptococcus pyogenes, which in 50 per cent. of the cases at least was pathogenic for animals. Under these circumstances, when we remember the bruised and lacerated condition of the genitalia after labor, which would naturally offer such easy access to the invading organisms, it would seem surprising that puerperal infections are not much more common. Czerniewski found streptococci in the lochia of 33 out of 81 women suffering

from puerperal fever, whereas in those from 57 healthy women he was able to find this organism only once. In ten fatal cases he demonstrated its presence in the various organs of the body after death.

On the other hand, Pryor reports 36 recoveries in 37 cases of puerperal sepsis, from which the streptococcus pyogenes was isolated, but he attributes his good results to the effects of the iodine which was set free from the iodoform gauze employed by him. Unfortunately, our own experience is far less encouraging and after carefully excluding errors in technique we have been forced to the conclusion that the organism with which Pryor had to deal was either less virulent from the form encountered by us, or that his patients had more resistance, or that his good results were possibly due to a combination of these two factors.

In order to arrive at some definite conclusions with reference to the streptococcus pyogenes as a cause of death in our own work, we have made an analysis of all our cases in which this organism has been found during the past six years.

It will be shown from our observations that quite a large number of our patients died, and one was unimproved. It will also be noticed that in the great majority of cases in which this organism was met with there was a previous history of infection following labor or an induced criminal abortion.

In the analysis of all cases the points noted were about as follows: name, age, condition, occupation of the patient, number of children and ages, miscarriages, most frequent symptoms, temperature and pulse on admission, highest temperature, highest pulse, lowest temperature, lowest pulse, average maximum temperature, average maximum pulse, lowest maximum temperature, lowest maximum pulse, leukocytes, operation, results, urinalysis, drainage, condition of the appendix, suppuration, class according to the operation.

Abortion Cases (Including a Few Cases of Labor after which Treatment was Necessary).

Total number of cases	137
Average maximum temperature	100.8°
Average maximum pulse	114

Operations.

Abdominal and vaginal	3
D. and C. with irrigation	71
D. and C. with irrigation and vaginal puncture	29
D. and C. (following labor with irrigations)	2
D. and C., vaginal puncture, and irrigation (following labor)	3
Pelvic abscess; vaginal puncture	1
Miscellaneous operations	6
No operative procedure	12
Abortions completed in hospital; none streptococcus; one died	10
Recoveries	104 or 75.9 per cent.
Improved	17 or 12.4 per cent.
Unimproved	1 or 0.8 per cent.
Died	15 or 10.9 per cent.

Operations in the Case of the Patients who Died.

Abdominal and vaginal	2
D. and C. and irrigation	5
D. and C., irrigation, and vaginal puncture	5
D. and C. and vaginal puncture (following labor)	1
Miscellaneous	1
Abortion completed in the hospital	1
	15

Streptococcus Pyogenes in Cases of Abortion or Following Labor

Total number of cases	16
Average maximum temperature	101.6°
Average maximum pulse	124

Operations.

Abdominal and vaginal	3
D. and C. and irrigation	2
D. and C., irrigation, and vaginal puncture	6
D. and C. and irrigation (following labor)	1
D. and C., irrigation, and vaginal puncture (following labor)	4
	16

Recoveries	4 or 25 per cent.
Improved	3 or 18.75 per cent.
Deaths	9 or 56.25 per cent.

In 16, then, of the 137 cases the streptococcus was found. The total number of all our cases (from all sources) in which streptococcus was found is 40. Consequently those in which this organism was found, following an abortion or labor, formed 40 per cent. of the total number of streptococcus cases from every source.

Operations in the Fatal Cases.

Abdominal and vaginal	2
D. and C., vaginal puncture, and irrigation	4
D. and C. and irrigation (following labor)	1
D. and C., irrigation, and vaginal puncture (following labor)	2

Furthermore, we find 5 cases and 1 doubtful case which were operated upon here (abdominal operation) not for abortion, but in which there was a history of a previous abortion or labor, followed by chills and fever, and other symptoms pointing to infection, mild or otherwise.

Cases in which the Streptococcus Pyogenes was Found (from all sources).

Total number of cases	40
Average maximum temperature	101.2°
Average maximum pulse	116

Operations.

Abdominal operation only	5
Abdominal and vaginal	14
(19, of which 7, or 36.8 per cent., died.)	
D. and C. and irrigation (following abortion)	2
D. and C., irrigation, and vaginal puncture (following abortion)	6
D. and C., irrigation, and vaginal puncture (following labor)	4
(16 cases, in which the vagina alone was opened; 6 or 37.5 per cent. of the patients died.)	
Pelvic abscess evacuated by vaginal punctur	1
Miscellaneous	7
Recoveries	20 or 50 per cent.
Improved	6 or 15 per cent.
Deaths	14 or 35 per cent.

Operations in the Fatal Cases.

Abdominal operation only	4
Abdominal and vaginal	3
D. and C., irrigation, and vaginal puncture (following abortion)	4
D. and C., irrigation, and vaginal puncture (following labor)	2
D. and C. and irrigation (following labor)	1

Of these 14 deaths in the streptococcus cases 9 or 64.3 per cent. were in cases following labor or abortion.

We find that in all cases the streptococcus was found alone or in combination in the following order of frequency:

(1) streptococcus alone; (2) streptococcus and staphylococcus aureus; (3) streptococcus, staphylococcus aureus, and B. coli communis.

As to the regions from which these organisms were obtained, we might say that in all cases (except 3 in which they were found in the vagina) the organisms were obtained from the uterus, the adnexa, the cul-de-sac, or from several of these situations. In other words, the organisms were present in places which were admittedly not their normal habitat.

In the past six years we have had 724 abdominal sections with a total of 25 deaths, a mortality of 3.45 per cent. In 7 or 28 per cent. of the deaths, the streptococcus pyogenes was demonstrated.

Number of streptococcus cases in the abdominal sections that recovered	12
Number of cases operated upon by abdominal section	19

Number recovered 12 or 63.2 per cent., leaving a mortality of 36.8 per cent. for the streptococcus cases in which an abdominal section was carried out.

It gives me great pleasure to acknowledge the valuable help of Dr. Winford Smith, the gynecologic interne at the Lakeside Hospital, in the preparation of the analytic table.

TWENTY YEARS' EXPERIENCE WITH MANUAL DILATATION OF THE OS AND CERVIX UTERI TO EFFECT IMMEDIATE DELIVERY IN THE LATTER MONTHS OF PREGNANCY; ALSO THE PRESENTATION OF A NEW OBSTETRIC UTERINE DILATOR.

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More than twenty years ago, while endeavoring to dilate the cervix uteri for the purpose of immediate delivery in a case of placenta previa, I discovered that with the hand within the vagina I could, with the thumb and the first finger, exert a very great dilating force upon the cervical ring. After the uterus, which had first barely admitted my first finger, had thus been dilated sufficiently to allow two fingers to be introduced, I found that by resting the extended first finger (which was in the uterus) upon the thumb and flexing the second finger (which was also within the uterus) a still greater dilating force could be exerted on the cervical ring.

The power thus obtained is owing to the fact that traction upon the cervical ring is effected by the strong flexor muscles of one or more fingers, while the point of countertraction is upon the dorsum of the first finger, which finger is sustained in a position of incomplete extension by resting upon the ball of the partially extended thumb. In this maneuver the flexor muscles of the thumb are the chief factors in the

countertraction. So considerable is the dilating force which may be thus applied by anyone who understands this method, that the os and cervix of any uterus of seven or more months' gestation may be enlarged, and the child and placenta delivered in an average time of one hour or less, provided the cervix uteri fully admits the first finger at the beginning of the operation.

So far as I know or have been able to learn, the first written description of this method of dilating the cervix uteri formed a part of a paper written by me and read at the Pan-American Medical Congress at Washington in 1893. I then reported a series of nine cases of placenta previa, all more or less aided and consequently delivered by this method and without maternal mortality.

After the reading of my paper in Washington I occasionally met with a physician who told me he had long used the method described in my paper. I always insisted that any such should show me the method. Not one, however, has been able to demonstrate the method used and described by me. I am particular to mention this fact to prove that the profession has had many misconceptions regarding this method of dilating the cervix. For such misconceptions I, perhaps, am more to blame than anyone, in that I did not in my original paper succeed in writing a very clear description of the method. A few evidently succeeded in understanding my description, and they have since learned from experience that they can place almost any patient seven or more months advanced in gestation upon the operating-table, manually dilate the cervix, and safely deliver the woman in the average time for all cases of less than one hour.

Having brought out and practised this particular method of dilatation for more than twenty years, I now wish to make record of some of the more important impressions which much experience has left upon my note-book and memory.

Manual dilatation of the cervix and immediate delivery have been performed mainly for the following conditions: placenta previa and eclampsia.

In more than one-half of the cases of eclampsia and placenta previa I have found the os and cervix uteri at least slightly and often one-third or one-half dilated. In less than one-half of all the cases in which immediate delivery was advised and practised there had been an entire absence of both labor pains and appreciable dilatation of the os uteri.[1]

Of the sixty or more cases wherein I employed manual dilatation not more than twenty-five can be placed in a class wherein neither labor pains nor appreciable dilatation of the os and cervix uteri preceded operation and delivery.

Nine years ago I collected for presentation (in discussion) at the Philadelphia Obstetrical Society my first ten cases of this class. Six were immediately delivered on account of placenta previa, and four of them because of eclampsia. General ether anesthesia was employed in every instance, the anesthetic being withdrawn at the moment the cervix uteri was sufficiently dilated to encircle the expanded fist. The membranes were then ruptured and a foot brought down. Uterine contractions usually rapidly ensued, and the delivery of the child and placenta was accomplished in a very short time.

The time employed to dilate the cervix uteri in the cases of placenta previa varied from sixteen to twenty-two minutes. The average for the six cases being nineteen and one-half minutes.

The average time required to dilate the os and cervix in the four cases of eclampsia was twenty-eight and one-half minutes.

Of the ten cases it may be said that the average time required to dilate the os and cervix uteri from the time the

[1] Most of my cases, especially in the past ten years, have been referred to me by their regular attendants

index finger could be introduced until the cervical ring was made to encircle the expanded fist was exactly twenty-three minutes.

The average duration of the second and third stages of the six cases of placenta previa was twenty-three and one-half minutes, while the average duration of the second and third stages of the eclamptics was twenty-seven and three-quarter minutes.

The average time for the three stages of labor in the placenta previa class was forty-two and three-quarter minutes; while the average time for the four eclamptics was fifty-six and one-fourth minutes for the whole operation.

The average time for dilating the cervix in all ten of these cases was twenty-three minutes, with an additional twenty-five and two-tenths minutes as the average time for the second and third stages of the delivery.

Thus it will be seen that the average time of all cases for the manual dilatation of the cervix, together with the delivery of the child and placenta, was forty-eight and two-tenth minutes. The most speedily delivered case was operated upon in forty minutes, while the longest one required seventy-five minutes. All of the women in this class of ten lived, excepting one, a case of eclampsia. As you will notice by the appended table, she had been comatose for sixteen hours prior to the delivery.

Although some bleeding occurred from cervical lacerations, in one case only did the loss of blood especially annoy me or cause apprehension of any particular danger. The case speedily recovered. Of this series of ten cases, only four of the children ultimately lived. The infant mortality is readily accounted for when we appreciate that the average duration of gestation for these ten cases was less than thirty-four weeks.[1]

Since the ten cases just referred to were reported to the

[1] See tabular report which appears as Appendix No. 1.

Philadelphia Obstetrical Society I have performed fifteen other purely elective deliveries. By purely elective delivery is meant delivery by operation where neither labor pains nor any appreciable dilatation of the cervix uteri had occurred.

The method of manual dilatation which I have employed presupposes the possibility of introducing the whole hand within the vagina and the index finger into the cervix to the metacarpophalangeal knuckle.

I have met with three women, all primiparæ, whose vaginæ did not admit my hand without laceration of the perineum and, to some extent, the vagina. (My own hand measures about seven and three-quarter inches glove measurement.)

For want of a proper lubricant and a Goodell or other cervical dilator, I once failed in the attempt to fully introduce my first finger into the cervix uteri. The anesthetic was withdrawn, the patient sent to the hospital, and successfully delivered at an elective operation one week later.

I prefer sterile soapsuds or sterilized and diluted tincture of soap as a lubricant for the hand. The perineum and vagina are less likely to be lacerated if the hand is slippery.

The fingers of the dilating hand should exert, so far as is possible, tonic strain upon the cervical ring. Spasmodic jerks or momentary out-thrusts of digital strength should never be practised. When the first hand grows tired, withdraw it and introduce the other. When it becomes fatigued, change to the first hand, thus maintaining as far as possible a tonic strain upon the ring.

While the tonic strain upon the cervical ring is being properly exerted the fist of the working hand itself occupies a perfectly passive position in the pelvis. On one occasion, having exhausted much of the strength of both my hands, I asked a most intimate friend and colleague who chanced to be present to relieve me. He and I both supposed that he was familiar with the particular method which I employ,

but from the continual alternating inward and outward movement of his arm at the vulva, and a more particular examination of his capabilities, I found that he did not at all understand the method.

There is danger of lacerating the cervix uteri by this method. I have myself in a few instances of the sixty or seventy women thus operated upon caused appreciable laceration of the cervix. Inattention to certain cautions which I am now trying to emphasize might surely result in embarrassing if not dangerous lacerations.

There is probably little risk of lacerating the cervix until after it has been sufficiently dilated to admit three or four fingers. When the cervical ring is enlarged to that degree the amount of force which was hitherto necessary and safely employed begins to become dangerous if continued. So that from the time three fingers and the thumb are admitted to the uterine cavity (when the circumference of the cervical ring will be found to measure from seven to eight inches), the cervical ring will not only be found to dilate with less force, but it is desirable that less force be applied in order that tearing or undue lacerations may be avoided.

I am convinced that in my earlier operations I generally used too much force in effecting the dilatations. Some uteri can doubtless be safely dilated from the size of one's first finger to a circumference of eleven or twelve inches in twenty-three minutes, which was the average time for my first ten cases of purely elective delivery, while other cases, especially such as have not advanced much beyond the sixth and one-half or seventh month, yield so slowly that one hour or one hour and a half may be required to effect full and harmless dilatation. I should say that fifty minutes might be taken as an average time for safely and fully dilating the cervical ring in purely elective delivery, and twenty or twenty-five minutes more for the completion of the second and third stages of labor.

My experience with placenta previa embraces twenty cases,

with but one maternal death. In only a small proportion of the cases was very much blood lost while dilating the ring. If in any case of placenta previa alarming hemorrhage should occur while effecting dilatation I should at once withdraw the anesthetic, rupture the membranes, bring down one foot, and allow the uterine contractions to effect the delivery. In no instance have I thought it necessary to resort to this encroachment upon the application of the Braxton-Hicks method.

My tendency in more recent years to employ a longer time for the dilatation is but the result of experience which has taught me that the risk of lacerating the cervix is greatly diminished by less speedy work.

It is the continual or tonic strain upon the cervical ring which dilates it. If the fingers and hand tire so that they cannot exert a moderately equable and continuous pressure, the work of dilatation lags. He whose hand can only exert a pressure for one minute, and must then be rested for three minutes, resumes the strain for one minute more, and rests again for three minutes, and so along until the uterus is fully dilated, should take about three times as long to safely dilate the cervix as the operator whose hand can exert the necessary unremitting pressure for three, five, or seven minutes, and can find that hand rested after the other hand performs a similar task. Probably some hands are weak or tire so rapidly that they are illy suited to the performance of manual dilatation of the uterus.

If at any stage in the task of dilatation the operator finds the cervical ring suddenly yielding, he is entitled to the presumption that he has unintentionally lacerated the cervix uteri.

It has been my custom in all cases to so fully dilate the cervix that it is not likely to offer any obstruction to the passage of the larger portion of the child.

I prefer, and have usually employed, general anesthesia, produced by sulphuric ether, and have always entirely with-

drawn the anesthetic at or before completion of the dilatation. It is doubtless an advantage to allow the patient to recover somewhat from the anesthetic before rupturing the membranes. I seek to bring down one foot and turn the child while the waters are escaping. Version, however, is often uncalled for, and might be dispensed with. The chief object in having the patient partly out of the anesthesia before rupturing the membranes is that nature may exert more of its force to aid not only the expulsion of the contents of the uterus, but that the physiologic contractions of the uterus may be more pronounced, and the dangers of intrauterine hemorrhage thereby lessened.

I believe that general anesthesia in labor predisposes to intrauterine postpartum hemorrhage. My preference for ether to chloroform is based upon a belief that the latter is more injurious to uterine muscular tonicity than is the former. Whether previous postpartum hemorrhage follows a physiologic or manual delivery, it has been my custom to at once widely open the vagina with a speculum or retractors, drag down the always patulous cervix uteri and ascertain the source of bleeding. If the blood pours from a laceration of the cervix I insert with a curved needle the catgut ligature at bleeding points. If needles and suture material are not at hand, and the demand for action appears very urgent, I grasp the bleeding point or points with one or more vaginal hysterectomy clamps. The forceps are removed on the day following. The amount of blood already lost, as in placenta previa, or the rapidity and weakness of the pulse at the wrist, may require that we not only avoid any further waste of blood, but that we also support the circulation by throwing a quantity of normal salt solution in a vein.

Any condition of the patient calling for an immediate or elective delivery is, from the very nature of things in itself serious, consequently any art which must be resorted to for the purpose of lessening the danger to the life

or lives in interest should be skilfully and cautiously practised.

In no instance can I remember of having accidentally ruptured the membranes while accomplishing manual dilatation of the cervix. One inexperienced in this work would suppose that the membranes would frequently be unintentionally ruptured while effecting the manual dilatation.

In total manual dilatation one must change from one hand to the other from five to ten or more times, according to the rapidity with which the hand fatigues.

For many years I have not reintroduced a hand without rewashing and resterilizing it. If gloves were worn a freshly-boiled glove was put on for each succeeding introduction of the hand, while the vulva was frequently irrigated with normal salt solution, and occasionally with a solution of bichlorid of mercury. The especial reason for irrigating the vulva with normal salt solution was that any escape from the rectum might be carried downward and away from the vagina. The stretching of a towel to cover the anus is of little value in protecting the ingoing arm from any discharge from the rectum, unless it is of several folds and its upper border held by the fingers of the assistants in such manner as to effectually form a dam across the perineum between the introitus vaginæ and anus. No attempt should be made to cover the rectum, but the energy of the assistants should be directed to thus draping a few folds of sterilized linen and holding it by firm pressure against the perineum. Notwithstanding all this care, however, the nearness of the rectum to the ingoing hand and arm would seem to expose the patient in a degree at least to the dangers of septic infection. I regard the necessarily repeated introduction and withdrawal of the hand as the most objectionable feature of manual dilatation.

With this brief review of my own work, which has been and may be so easily imitated by others, and which has the one and very great characteristic advantage of being non-

instrumental, I wish to direct your attention to another method of effecting dilatation, but which possesses one very serious disadvantage, and that is that, unlike the hand, we may not always have it with us when required for use.

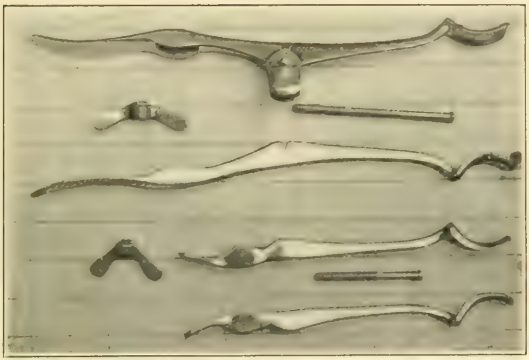
The instrument which I am about to present to you was recently devised by me, and with it I have since effected two purely elective deliveries. (Fig. 1.) One, for a small and contracted pelvis, where in the interest of the child the birth was precipitated at the thirty-seventh week. The other, a case of placenta previa, between the sixth and seventh months of uterogestation. As you will see, the instrument consists of two levers about twelve inches long, with a fulcrum near the center of each. One of these long levers has a pin through its center, either end of which serves as a fulcrum for the two short levers, which move in transverse plane to that of the long levers. Each pair of levers is provided with a bolt and thumb-nut, with which to hold all advancement gained. The spring or resiliency of the levers effects the tonic strain upon the cervical ring. (Fig. 2.)

The limit of expansion upon the two long levers is about four inches, which, of course, effects a dilatation of the cervix, amounting to about eight and three-quarter inches circumferential measurement.

In the middle months of gestation it will be seen that the cervix may be dilated sufficiently by this pair of levers to permit the escape of the uterine contents; but for purely obstetric purposes, from the thirtieth week of gestation onward, the cervical ring should be dilated from eleven to twelve inches in circumference. When the limit of expansion possible with the long levers is attained the two short levers are introduced. (Figs. 3 and 4.)

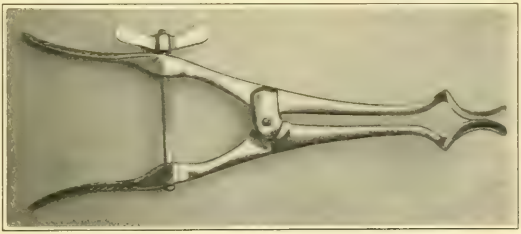
By the combination of the two pairs of levers the cervical ring can be dilated to twelve inches. The levers are introduced one after another in the following manner:

While the vagina is being held open with a speculum or retractors, grasp the cervix with a hook or traction forceps.



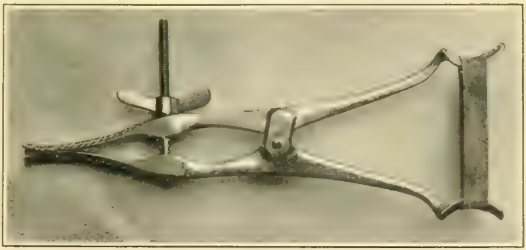
Showing the various parts of the dilator. The lines breaking the field into squares are one inch apart, by which the dimensions of the various parts of the instruments can be readily determined.

Fig. 2



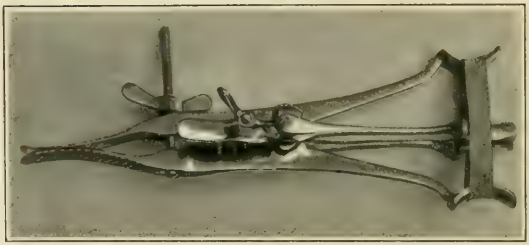
Showing the two long or working levers with terminals closed.

Fig. 3



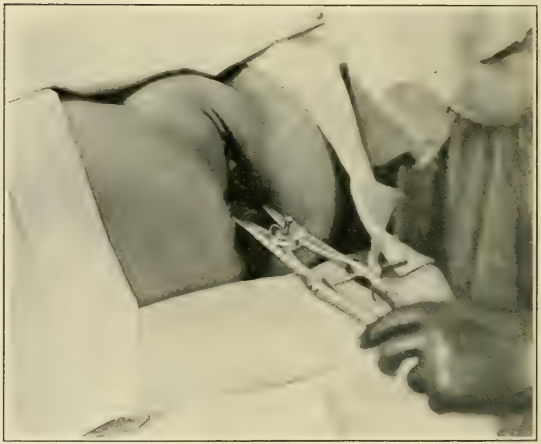
Showing the terminals of the long levers opened to the limit of their movements. The rubber band upon the terminals indicates the relation of the

Fig. 4.



Showing the short levers set in place on their fulcrums.

Fig. 5.



Showing the proper position of the long levers while in action. About one-half of the dilatation possible with them has already been effected. (Taken in the preparation for delivery on account of placenta prævia on May 8, 1904.)

If the cervix will not admit both the long levers, it must first be sufficiently dilated with a Goodell or other cervical dilator.[1] So soon as the cervix will allow introduction of the two long levers, lock them at the fulcrum, set the bolt in the handles, approximate the hand-parts and hold them in place with the thumb-nut. (Fig. 5.)

About every two minutes by the watch reapproximate the hand-parts of the levers, turning the thumb-nut by the merest touch of one finger until it is again arrested upon the lever. The spring or resiliency of the levers bears such relation to the naturally yielding character of the cervix that renewed pressure upon the proximals of the hand-parts after each succeeding interval of two minutes or less will permit the thumb-nut to be turned for about one-quarter of a revolution.

My dilator as at present made is without a pelvic curve, so that from the moment it is applied until the dilatation is completed the operator or his assistant should maintain a slight but constant pressure downward upon the perineum; but he should also at the same time steadily but slightly continue to press the instrument upward in the pelvis and against the cervix, in order that the cervical ring may not slip off the terminals.

All my experience in manual and the slight experience in instrumental dilatation of the cervix in the latter months of pregnancy convince me that at the beginning of dilatation far greater force is required than at later stages of the task.

From a series of tests of the strength of my own hand as applied in manual dilatation, and also from a study of the force exerted upon the levers of my dilator, I judge that in the beginning of dilatation of the cervix uteri from fifteen to twenty pounds of countertraction are probably not only bearable but requisite for the proper advancement of dilata-

[1] The writer has already devised extension tips for this instrument, which may be momentarily attached to it and used to dilate the cervix sufficiently to first admit the long levers, thus dispensing with the need for a Goodell or other dilator to begin the dilatation.

tion. As the cervix grows larger, less force is required, so that when the cervical ring has been dilated to a circumference of six or seven inches, I judge that a countertraction force of from ten to fifteen pounds is not only sufficient to carry along the work of dilatation, but that this compression may be reapplied after shorter intervals than was possible in the earlier stages of the task. A gradually diminishing force is not only advised in the finishing stages of the dilatation, but this lessened force will be found to increase the dilatation more rapidly than the greater force which was applied at either the beginning of dilatation or in the middle stages thereof.

I am particular to direct attention to my assumptions in this relation, for by so doing I may prevent the inexperienced from applying undue force in the latter stages of dilatation, whereby unnecessary lacerations of the cervical ring might be effected.

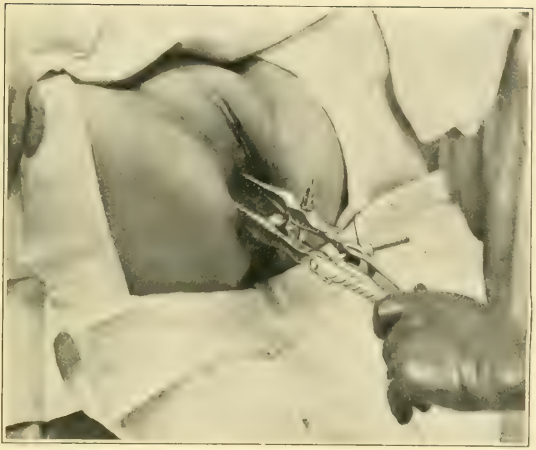
This caution is directed even more to the manual than the instrumental operator, for the reason that the strain exerted by the fingers upon the cervical ring cannot be so definitely gauged as that exerted by one finger and a thumb upon the proximals of such an instrument as I have devised.

When the limit of dilatation possible with the two long levers is reached the two short levers are introduced and the bolt set and tightened with the thumb-nut.

The next step is to gradually release the strain upon the long levers and to just as rapidly take up with the short levers every particle of slack in the cervical ring. (Figs. 6 and 7.) In this manner continue the transference from the long to the short levers until the proximals or thumb-parts of the short levers are together. (Fig. 8.) We thus, without much risk of dislodging the cervical ring from the instrument, practically transfer the strain and distention of the cervix from the long to the short levers.

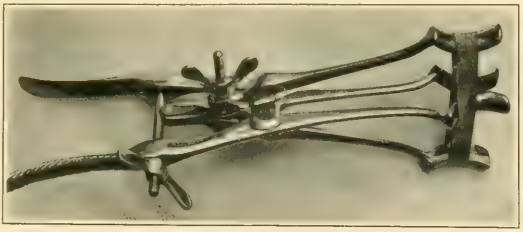
This accomplished, renew the intermittent approximation of the hand-parts of the long levers, holding every succeeding

Fig. 6.



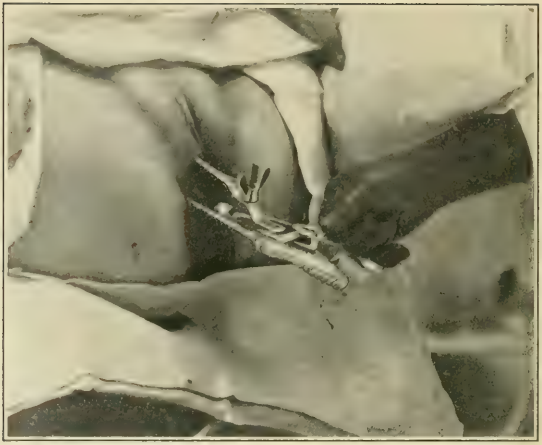
Showing full expansion by long levers, with the short levers placed in position and ready for the transference of the partly dilated cervical ring from the long levers to them.

Fig. 7.



Showing transference of the partly dilated cervix from long to short levers.

Fig. 8.



Showing the position of the short levers after transference to them of the strain from the long levers. The hand parts of the long levers appear widely separated and are ready for their reapproximation required for a continuance of the dilatation.

Fig. 9.

Showing the position of all levers when the cervical ring has been fully dilated by opening for the second time the terminals of the long levers.

gain with the gentlest turn of the thumb-nut, to which must never be applied more force than is possible with the touch of a single finger. Almost before the full limit of the four levers is attained the unruptured membranes will present themselves to view at the vulva. (Fig. 9.)

Thus the work of dilatation, if slowly effected, is accomplished easily and safely, and the uterus afterward so rapidly emptied that I feel as though I should never again employ manual dilatation if this dilator is at hand.

By the use of two simple levers, with the fulcrum near their centres, the dilating strain upon the cervical ring nearly equals the pressure exerted by the hand upon the tips of the hand-parts. The instrument thus constructed, when used, at once becomes an educator of the senses required for its proper employment. Obstetric dilators in which the strains are effected with a screw are undoubtedly open to the very serious objection raised by Dr. J. Whitridge Williams and possibly others, that one has no idea of the amount of force or strain thereby exerted upon the cervical ring.

Conclusions. If the condition of any patient is such that elective delivery is desired and advised for her, the delivery can be effected by first fully dilating the os and cervix uteri, either with the hand or by a simple multi-lever dilator.

The strain upon the cervical ring should not be too strong and as nearly equable and constant as possible. Some uteri may safely yield to the mechanical strain exerted by the operator and dilate as much in thirty minutes as will others in ninety minutes.

The greatest strain, possibly fifteen to twenty pounds, is needful in acquiring the first four or five inches of dilatation. As the cervical ring enlarges beyond this point the strain should be gradually diminished.

Any strong hand employing the particular method practised by the writer is doubtless capable of lacerating the cervix after its ring has been one-third dilated.

Fifty minutes may be taken as the average time required to *safely* dilate the os and cervix uteri from the size of one's

finger to a circumference of twelve inches. Twenty-five minutes should be the average time for rupture of the membranes and delivery of the child and placenta.

The hand can never be made to exert the continuous and equable strain upon the cervical ring which may be imparted by a properly constructed simple lever dilator.

The instrument which effects a moderate but steady and unremitting strain and in which the operator balances the strain on the proximals of the levers is probably the ideal method of effecting rapid dilatation.

In the latter months of gestation the cervical ring should be so enlarged that it is not likely to offer any obstruction to the birth of the child. The occurrence of alarming hemorrhage in placenta previa may demand more rapid enlargement of the cervical ring than is generally advised for other purposes, while version and bringing down of one foot before very much dilatation is effected may be the measure requisite to avoid further loss of blood and save the mother.

When this instrument is placed on sale you will find it provided with movable tips so constructed that they can be momentarily attached to the terminals of the two long blades and so shaped that they will serve to dilate any cervix which is not large enough to admit the broader terminals of the two long levers as you now see them. Furthermore, the instrument will also be provided with a dial to register the number of pounds of strain upon the cervical ring, and this weighing device will be so adjusted that the amount of tension will be shown at any stage of the dilatation.

Although I have assumed that a given number of pounds of strain are requisite for the accomplishment of dilatation of the cervical ring, I wish to emphasize the assertion that such estimations may be open to considerable modification by me or by others who may hereafter work with my improved dilator, whereby the exact number of pounds of strain may be noted as frequently as the operator desires from the very beginning to the completion of dilatation.

APPENDIX I.

Brief report of ten cases of purely elective delivery presented to the Philadelphia Obstetrical Society, March 7, 1895, by the author, embracing every case delivered by him in which neither labor pains nor appreciable dilatation of the os uteri preceded operation.

No. of case.	Operated for	In presence of	What labor.	Anesthetic during dilatation.	Time required to dilate cervix from index finger to expanded fist, in minutes.	Time required for completion of 2d and 3d stages, in minutes.	Total in minutes.	Mother.	Child.	Month of utero-gestation.
1	Placenta previa	Dr. Amfraux	First	Ether	21	28	49	Living	Dead	8th
2	" "	Dr. J.W. Smith	Fourth	"	20	25	45	"	"	7th
3	" "	Drs. Smith and Millspaugh	Fifth	"	16	24	40	"	"	7½
4	" "	Dr. Doty	Fourth	"	22	22	44	"	Living	8½
5	" "	Dr. C. Maginnis	Third	" (?)	22	23	55	"	Dead	8th
6	" "	Dr. C. Van Riper	Multipara	"	16	19	34	"	Living	8½
7	Eclampsia and comatose ten hours before operation	Dr. West	"	"	22	27	49	"	"	8½
8	Eclampsia and comatose five hours before operation	Dr. Williams	First	" (?)	55	20	75	"	Dead	7th
9	Eclampsia and comatose sixteen hours before operation	Dr. Merrill	"	" (?)	18	37	55	Dead	"	7½
10	Eclampsia and comatose six hours before operation	Dr. B. F. Rogers	Fifth	"	18	27	45	Living	Living	7th

The above table was never published in any book or journal. It was simply printed in this form in order that it might be presented as a part of the author's discussion before the Philadelphia Obstetrical Society.

APPENDIX II.

Comparison of some of the more important advantages and disadvantages of manual and instrumental dilatation of the os and cervix uteri in the latter months of pregnancy.

The hand method.	*The instrumental method, by simple levers with weighing device attached as devised by the writer.*
The hand is always with the operator.	It is an instrument for which the general practitioner would have but little and infrequent legitimate use.
Most but not all hands are strong enough to apply the force required for dilatation. Because of the fatigue, the countertraction strain is more or less irregular.	Always ample in force. Maintains a continuous and equable strain upon the cervical ring without fatigue to the operator. Constantly indicates the strain in pounds as shown on the dial.
Cannot be sterilized by boiling, although the rubber gloves if at hand can be thus sterilized and worn.	May be sterilized by boiling.
Hands must be rested, thus requiring in some cases twelve or fifteen introductions of the hand within the vagina, loss of time and some risk of infecting the patient.	Unless the cervix is so small as to require the tips to begin the dilatations, the instrument is introduced but once, and is not removed until dilatation is completed. With vaginal retractors and a hook the instrument can be introduced without passing the fingers into the vagina.
Some vaginæ are too small to admit the hand without laceration.	Every vagina should admit the instrument and tolerate its expansion so far as its use for dilatation may be necessary without injury.
The operator forms indefinite ideas of the amount of force exerted on the cervical ring.	The operator may read at any moment the amount of force exerted on the cervical ring.

THE IMPLANTATION OF THE HUMAN OVUM IN THE UTERUS.[1]

By Charles Sedgwick Minot, LL.D., Sc.D.,
professor in the harvard medical school, boston.

The discovery of the fact that certain tissues can attack and destroy others is one of the most important discoveries of recent years. It is perhaps to be regarded as a process of digestion of one tissue by another. It is known that certain young tissues of the embryo are in part endowed with a capacity to destroy the tissues with which they come in contact. This phenomenon has an intimate relation to many diverse developmental processes. It appears that a tissue may produce a destructive agent, presumably chemical in character, from which the tissue itself under normal conditions does not suffer, but which will destroy other tissues with which it comes in contact. Our present knowledge leads us to believe that such a phenomenon occurs during the early stages of the human ovum and affords us an approximately correct conception of the most important steps in the earliest history of the ovum, by which its original relations to the uterus are established. Embryologists designate this early attachment, the insertion of ova upon the wall of the uterus, by the term *implantation*. In animals which have claws and are therefore called unguiculate, such as carnivora and primates, including man, the chorion is supplied with bloodvessels and enters into intimate relations with the wall of the uterus. It has been my privilege to investigate the changes involved in the estab-

[1] Read by invitation.

lishment of such relations in various animals, and I find, as other observers also have found, that the ectoderm of the chorion undergoes a peculiar proliferation by which its cells become very much more numerous. Some of the cells rapidly assume a distinctive character, and are easily recognized by their large size. It further appears that wherever these modified ectodermal cells come in contact with the walls of the uterus, destructive changes go on in the uterine tissue. The facts indicated suggest that these cells produce a substance which is capable of digesting or dissolving the substance of the uterus. As the ectodermal cells in question are important and highly characteristic of many placental mammals, I propose for them a special name, *trophoderm*.[1] The function of the trophoderm is to corrode away a portion of the mucous membrane of the uterus. In man this corrosion takes place so as to make a cavity in which the ovum lodges itself. The trophoderm thereupon undergoes a hypertrophic degeneration, which occurs so as to produce a series of irregular spaces, which persist and become the intervillous spaces of the placenta. Papillary outgrowths of the chorionic mesoderm meanwhile penetrate the trophoderm, initiating the formation of the chorionic villi. The trophodermic cells over each mesodermic outgrowth persist in two layers: the inner, cellular, and the outer, syncytial. These two layers represent the first stage of the ectoderm of the villi.

In many animals the trophoderm does not cover the whole of the ovum as in man, but is spread only over a small portion of the chorion. This portion is sometimes designated as the placental area. A restricted placental area of this sort can be readily observed in the early stages of the rabbit, dog, or cat. On the other hand, there are a few animals, such as the

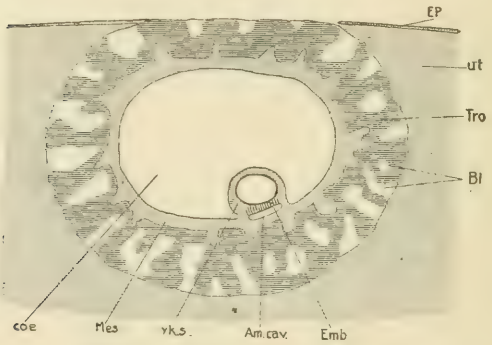
[1] In the address the term "trophoblast" was used in accordance with my understanding of Professor Hubrecht's views and consent; but as Professor Hubrecht has objected to this application of his term, it has been necessary to propose a new one. I regret that so good a name as trophoblast has to be dropped.

hedgehog and guinea-pig, in which the trophoderm is very precociously developed, so as to be present at a time when the ovum has advanced but little beyond the first stages of segmentation. The trophodermic cells in these cases increase in number, form considerable layers, and where they come in contact with the walls of the uterus, attack and destroy part of it, so that a hole is made in its wall the exact size of the young ovum. The process in such cases is similar to that which has been observed in man, but with the difference that it occurs while the ovum is much less advanced in its development.

Turn now to observations which concern the primates and man. Owing to the investigations of Selenka and of Kollmann, we know that a true trophoderm exists in the early stages in monkeys and apes. It has been actually observed in various old-world monkeys, in the gibbon, and chimpanzee. Ova of these animals have been also observed in which the trophoderm seems to have corroded away the uterine wall and made a place for the newly developing organism. The evidence in regard to implantation in man may be briefly indicated as follows: *First*, we have a number of ova in very early stages in which the trophoderm can be distinctly seen over the outside of the ova; it is most developed in the very earliest stages heretofore recorded, and it rapidly degenerates, but in these very earliest stages the implantation in the uterus has already taken place. The ovum is lodged in a cavity of the mucosa. *Second*, we have the numerous observations which show that the trophoderm has the power of destroying uterine tissue in various animals. The conclusion from this double evidence is obvious; that the trophoderm in man has for its special function the accomplishment of the primitive insertion of the developing germ into the wall of the uterus. This conclusion is further corroborated by the evidence from apes and monkeys. In short, it seems scarcely too much too say positively, in the light of our present knowledge, that the function of the trophoderm

as the means of implanting the human ovum is demonstrated.

Peters' ovum still remains the earliest stage of man yet described. It has a small chorionic vesicle, on the exterior of which is a very considerable layer of trophodermic cells, which stretches completely around the vesicle, and which in thickness equals a quarter or a fifth of the diameter of the



Explanation of diagram, based on Peters' ovum.

Ep, uterine epithelium; *Ut*, mucous membrane (decidua) of uterus; *Tro*, trophoderm; *Bl*, spaces formed by the degeneration of the trophoderm; maternal blood enters these spaces from the decidual bloodvessels; *Emb*, embryonic shield; *Am. cav*, amniotic cavity; *Yk.s*, yolk sack, the entodermal lining of which is indicated by a heavy black line; *Mes*, chorionic mesoderm; *Coe*, extraembryonic celom.

entire chorionic vesicle. This external layer is made up entirely of proliferated enlarged cells of the chorionic ectoderm. There is an embryonic shield present at this stage, but nothing which can properly be called an embryo. The total diameter of such a vesicle is 3 or 4 mm. Even in this the youngest stage, which has been actually observed, the trophoderm has undergone a certain amount of degeneration, and there are consequently already a series of cavities

as represented in the accompanying diagram, which we identify as the beginnings of the intervillous spaces. The diagram also shows that there has been precociously developed a special layer of connective tissue lining the interior of the chorion and forming a series of projections or papillæ.

We are so fortunate as to have a series of specimens in the embryological collection at the Harvard Medical School sufficient to enable us to gather a general notion of the origin and development of the chorionic villi. We find that the trophoderm undergoes its degeneration probably exclusively after it has performed its function of making a place for the ovum in the wall of the uterus. As it degenerates the trophoderm covering of the incipient villi becomes thinner, the mesoderm of the villi meanwhile continues to grow, and the original simple papillæ become branching, until finally we have the remnants of the trophoderm converted, as above stated, into the double layer of cells, the so-called chorionic ectoderm. For a considerable period, however, there are always accumulations of the original trophoblastic cells preserving something of their primitive character to be observed at the end of the villi. Thus, in an ovum of 8 mm. in diameter, we observed that the amount of the trophoblast has been greatly reduced as compared with Peters' ovum, and that the mesoderm had extended farther down, and hence the structure of the villus was more clearly defined. By the time the ovum is eleven or 12 mm. in diameter there is little trace of the trophoderm left, and it is about at this period of development that we begin to recognize the formation of embryonic structures, so that we may say that the entire history of the trophoderm is completed, and all its functions are accomplished before the embryonic structures are existent. Peters' observations indicate that the ovum becomes completely embedded in uterine mucous tissue and that the thickness of the mucous membrane at the time of implantation is a little greater than the total diameter of the ovum. The tissue of the uterus, which lies adjacent to the ovum with its trophoderm, has preserved its

normal structure; it shows no change. The tissue in the space occupied by the ovum we might imagine to have been cut off as if one had taken a sharp instrument and made a spheric cavity of a few millimeters' diameter. We can explain this condition as indicated by assuming that the uterine tissue has been corroded out or dissolved away by the action of the trophoderm, and it is further to be presumed that the ovum has not only been thus providing a place for itself, but that also it has been actually digesting portions of the uterine tissue, growing, therefore, at the mother's expense. This involves the idea that the uterine tissue has been digested and absorbed by the trophoderm; hence the name which is given to this layer. The immediate consequence of the corrosion of the uterine tissue is the production of a wounded surface, and if there happens to be a bloodvessel which comes in the path of corrosion, it may have a portion of its wall corroded away, and then the blood, which would otherwise be restrained within the bloodvessel, can and does apparently escape into the spaces where the trophoderm has degenerated and disappeared. Thus, in this very early stage the maternal blood passes out from the maternal vessels into the trophodermic or later intervillous spaces. Therefore, there is an extravascular circulation established at the very start when the ovum first implants itself in the wall of the uterus. We must say, then, contrary to current descriptions, that the intervillous circulation is almost the first thing established in the uterus for the purpose of nourishing the embryo, and, indeed, we might almost say that the intervillous circulation begins before the villi have formed, for before there are villi we find maternal blood circulating in spaces bounded by fetal tissue. In brief, we may assert that the essential conditions for the development of the placenta are established during the implantation of the ovum and that the ultimate development of the placenta is brought about by a modification of this primitive disposition.

It may be convenient to add here a few words as to further

degenerative changes in the pregnant uterus. This is especially important as a means of illustrating the fate of the decidua reflexa. As is well known, this membrane is present during the first half of pregnancy and absent during the second. I am able to demonstrate by a series of specimens which I have in my laboratory that the disappearance of the decidua reflexa is accomplished by degeneration, followed by absorption. As soon as the decidua reflexa has been thus removed, it becomes possible for the chorion of the embryo to come into immediate contact with the decidua vera, and, as is well known, this contact is characteristic of the second half of pregnancy. We do not yet know the exact date at which this condition is completely established. We know only that by the end of about the fifth month the decidua reflexua has usually entirely disappeared. So that even that portion of the chorion, which we can reach by passing up through the cervix of the uterus, is in the later stages of pregnancy uncovered by any uterine membrane. If the decidua reflexa did not degenerate and disappear completely that bit of chorion would have a covering of decidual tissue, which, as you know, is not present at term.

Such are the main points, briefly outlined, relative to the implantation of the human ovum in the uterus. I have only to indicate, in conclusion, that the greater part of this investigation has been done by others, though I have, fortunately, some material in my own possession by which I have been enabled, to a considerable extent, to confirm these observations, and in some particulars to extend them.

Before concluding, may I state that we are forming a collection of serial sections of human embryos in the Harvard Medical School. These sections are prepared by a skilled technician, who has been especially trained to the work. The collection is intended always to be open to competent investigators and students. May I not hope that we may have the co-operation of the members of this Society in securing specimens which would be available for the development of this

collection? Those of the first and second months are especially desired. They may be easily preserved by placing them in a mixture of one part of formalin with nine parts of water, as soon as possible after they are obtained.

I beg to thank the Society for the courtesy shown me.

PAPERS

PRESENTED TO THE COUNCIL BY THE

CANDIDATES ELECTED TO FELLOWSHIP

AT THE

TWENTY-NINTH ANNUAL MEETING.

ANATOMY, PATHOLOGY AND DEVELOPMENT OF THE HYMEN.

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In a discussion of the female genital organs the hymen must be given separate consideration. An exact knowledge of the anatomy and pathology of the hymen is important not only from a practical point of view, but also because it affords valuable evidence concerning the development of the female genitalia. Systematic investigations of the nature of the hymen, however, meet with some difficulty inasmuch as suitable post-mortem material is not easily obtained and portions of tissue excised during life are not often at our disposal. The observations underlying this article are based upon the microscopic examination of fifteen specimens of hymen, as follows:

1. From a fetus 8 inches long.
2. From a fetus $9\frac{1}{2}$ inches long.
3. From a fetus $10\frac{3}{4}$ inches long.
4. From a fetus of 25 weeks.
5. From a fetus of 7 months.
6. From a fetus of 8 months.
7. From a newborn (macerated).
8. From a girl of 3 days.
9. From a deflorated girl of 19 years.
10. From a virgin of 20 years.
11. From a virgin of 20 years.
12. From a deflorated girl of 30 years.
13. From a virgin of 62 years.
14. Caruncle from a woman of 49 years.
15. Caruncle from a woman of 76 years.

Anatomy.—The hymen is a membrane situated at the junction of the vulva and vagina, partially closing the entrance of the latter. Older reports speak of the site of the hymen as being sometimes higher up in the vagina. Cumston,[1] in a medicolegal essay, refers to a trial for rape, in 1777, at which trial it was admitted by the medical authorities that the hymen was in some cases situated an inch or an inch and a half "beyond the vagina." Krimer[2] found, in a woman of twenty years, the hymen high up, 2 cm. above the vaginal entrance, the vulvar orifice seeming at first sight to lack the membrane altogether. Turnipseed[3] and Fort[4] stated that the hymen in the negress is situated from one and a half to two inches above the entrance of the vagina and is of greater density than that of the white woman. These statements were at once contradicted by Hyatt[5] and Smythe;[6] and inasmuch as no similar observations have since been recorded, we are safe in attributing them to inaccurate examination or erroneous diagnosis.

Aside from the human female, the hymen, according to Hirst,[7] is formed in the ape, bitch, bear, donkey, hyena, and giraffe; and according to Nagel,[8] also in the horse, cow, and pig. Bischoff,[9] on the other hand, states that the hymen is lacking in the anthropomorphic apes.

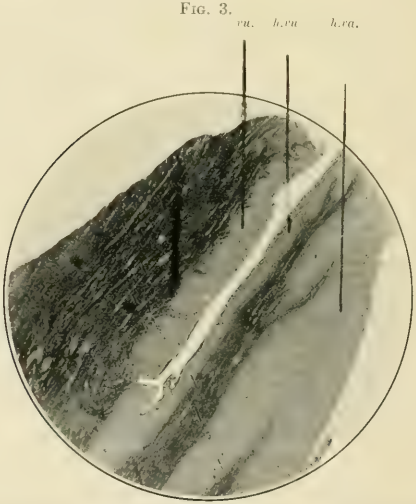
The macroscopic appearance of the hymen is in the majority of cases that of a semilunar fold. Next to the crescentic form in frequency is the annular variety, in which the hymeneal opening is circular in shape. Less frequently other forms of hymen are found. The septate hymen has two openings separated by a bridge of tissue. The cribriform hymen shows a number of small openings resembling a sieve. The fimbriated hymen has small papillary excrescences upon its free edge. In the imperforate hymen, the membrane is completely occluded. Most modern text-books give instructive illustrations of these and other even more unusual varieties, and a glance at these pictures explains the macroscopic differences better than words.

Fig. 1

Hymen of a fetus of twenty-five weeks (Case I). *General survey*; *h*, hymen; *e*, epithelial mantle; *c*, connective-tissue stroma; *va*, vagina with papillæ; *vu*, vulva; *l*, labium minus; *l.m*, labium majus.

Hymen of a fetus of eight months (Case 6): *f*, fibrous band connecting the slender basal papillæ (*p*) with the hymen proper (*h*) and shutting off a mass of epithelial cells (*c*); *vu*, vulva; *va*, vagina.

FIG. 3.



Hymen of a fetus of seven months (Case 5): *vu*, vulva; *h.vu*, vulvar side of hymen; *h.va*, vaginal side of hymen.

The color of the hymen is white or light pink. In the fetus it is, like the vagina, distinctly white and in marked contrast to the pinkish color of the vestibule. I shall refer later to this decided difference in color. The thickness and consistence of the hymen vary widely from a structure delicate as a spider's web to a dense, ligamentous, even cartilaginous or "bony" membrane.

In its position and relation to the vulva the hymen in the fetus projects forward into the cleft between the labia in the form of two apposed longitudinal lips. This condition exists also in the newborn and in the young child, while in the virgin the membrane is generally supposed to be stretched in a more or less vertical plane when the individual is lying in dorsal posture. Cullingworth,[10] however, pointed out that on separating the labia minora in such a manner as not to disturb the situs of the structures lying behind them, the hymen can be seen in the same position as in the fetus and infant—*i. e.*, eversion of closely apposed longitudinal lips.

In the hymen we distinguish, first, the base, the point at which it rises from the underlying tissue; second, the edge, which is differently shaped according to the individual case; and third, two sides or surfaces, the inner (upper, vaginal) and outer (lower, vulvar) surface. While, according to Dohrn,[11] one week after the first appearance of the hymen it is as fully developed as is usual in the newborn, the microscopic picture varies with the age of the bearer. The hymen is composed of a dense connective tissue covered on either side with epithelium. In the fetus it projects in the form of a long slender fold exhibiting on either surface numerous filiform and conical papillæ. Kölliker,[12] Dohrn[11] and others describe these papillæ only upon the inner surface, but Schäffer[13] had already pointed out that they are almost invariably found also on the vulvar side. Among the papillæ which in their turn frequently possess smaller secondary papillæ, there is one of conspicuous length found with great frequency upon the vaginal side springing from the base of the hymen or

immediately below it and extending more or less parallel to the hymen itself. This fold of tissue is mentioned by Schäffer as the inner vaginal lamella (see p. 171), while Klein[1] uses it in the measure of the septum between the Müllerian ducts. The epithelium is of the usual multilayered pavement type. The cells of the basal layer are cuboidal in shape, then follows a layer of lower cubic cells and several layers of polyhedral cells which become gradually flattened toward the surface, the outermost layers consisting of thin, plate-like cells. Keratohyalin does not occur to this early stage, the nuclei throughout taking the stain readily. Usually the epithelium is slightly higher upon the vaginal surface. The epithelium upon the vulvar side in these cases has a somewhat compressed appearance, the layers following the basal layers are not polyhedral but markedly flattened. This condition is visible in the hymens of the ninth and seventh fetal months. Figs. 2 and 3.

The hymen of the newborn is of considerably greater size. A very long papilla was in one of my specimens found upon the mother side (Case 8, Fig. 4). From the nine between ninth and nineteen years no specimens were at my disposal. Case 9 (nineteen years) and Case 10 (twenty years) presented within the rather compact hymen numerous short and a few longer slender papillæ which penetrated deep into the epithelial mantle without, however, altering the smooth outer surface. On the other hand, in a second case of twenty years (Case 11) the surface of the hymen showed intervalvular corrugations, corresponding with the large papillæ there present. The latter possessed numerous secondary papillæ (Fig. 5). The same appearance was present in the hymen of thirty years (Case 12). The process from the inner surface of which we have spoken above was in this case markedly increased in size. The epithelial mantle in all of these cases was very thick but somewhat cornified. The connective tissue in the hymen of the fetus, newborn and adult, is dense with numerous nuclei. Only in the papillæ is the structure somewhat looser.

The bundles of connective tissue seem to be directly continuous with the vaginal connective-tissue fibres. In the amount of nuclei as well as in the density of the fibres, the hymen is readily distinguished from the vulva. The blood supply is rather rich. Numerous bloodvessels and capillaries are seen even in the tips of the finest papillæ, and in the hymen of the adult wide lumina are visible (Fig. 5).

In the last specimen, that of a virgin of sixty-two years (Case 13), the rather short hymen presents, on cross-section, a somewhat tongue-shaped appearance and is covered with a few layers of cells with scanty protoplasma, but well-staining nuclei. The connective tissue shows no papillary elevations except a few low ones on the vulvar side. It is greatly increased, especially near the base, and its fibres form large bundles, with markedly diminished blood supply.

To study the distribution of elastic fibers in the hymen, Weigert's stain was used. Broadly speaking, a gradual increase both in number and thickness of the elastic fibres takes place throughout the existence of the membrane. In the fetal hymen elastic fibers are present as soon as the membrane is formed, but they are very delicate and can be seen only with the oil-immersion lens. Running along the base of the epithelium can be seen a fine elastic fiber. This fiber closely follows the contours of the hymen and seems to form an uninterrupted elastic membrane. Only in some of the finer papillæ is the continuity lacking in the earlier stages, but in the fetal hymen of eight months the elastic membrane has reached even these points. This membrane does not send any processes into the adjoining tissues, and nowhere do elastic fibers penetrate into the epithelial mantle. In the connective-tissue stroma there are but a few thin, short elastic fibers which run in a longitudinal direction, parallel to the connective-tissue fibers. The capillaries near the tip of the hymen have no elastic fibers. Only the larger vessels near the base have a very fine, internal elastic membrane. An outer circular layer of elastic fibers in the adventitia of

arteries is visible only in a few instances in the eight months' hymen. From this external membrane a few very delicate fibers emerge into the adjacent bundles of connective-tissue fibers and there assume a longitudinal direction.

In the hymen at full term the elastic fibers are readily seen with the oil immersion. In the papillæ they appear in long bundles which enter into the finest ramifications of the papillæ. They surround the capillaries in the papillæ and near the free edge, without, however, entering into closer union with them. In the vessels of the deeper layers, the delicate internal elastic membrane, upon which lies the endothelium, can be readily distinguished from the outer elastic membrane in the adventitia. The two membranes are connected by a very few elastic fibrils. In the transverse sections of larger arteries of the base such anastomotic fibers in the circular muscular layer between the two membranes are numerous. The elastic fibers emanating from the adventitia are likewise increased in number. The fibers in the connective tissue run both longitudinally and transversely, and increase in quantity but not in size nearer the base.

In the adult, the elastic fibers in general are thinner and less numerous in the higher portions near the edge than toward the base. In the latter the field of vision is almost entirely filled with a network of delicate fibers surrounding the connective-tissue bundles. In the hymen of a girl of nineteen (Case 9), a few months after defloration, the new-formation of elastic fibers at the torn edge is excessive. The elastic membrane at the base of the epithelium, which consisted of but a single fiber in the fetus, is composed of a complex arrangement of delicate fibers which are wound about themselves. In general, the elastic fibers may be divided into two groups, one more or less circular around the hymeneal opening, the other extending radially towards the base.

With growing age the elastic fibers perceptibly increase in quantity and size and take the stain very readily. In the

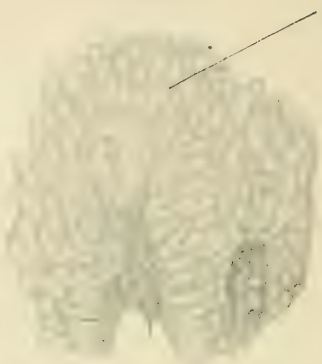
Fig. 4.

Hymen of the newborn (Case 81): *a*, long, slender papilla on vulvar surface. Numerous bloodvessels in connective-tissue stroma

Fig. 5.

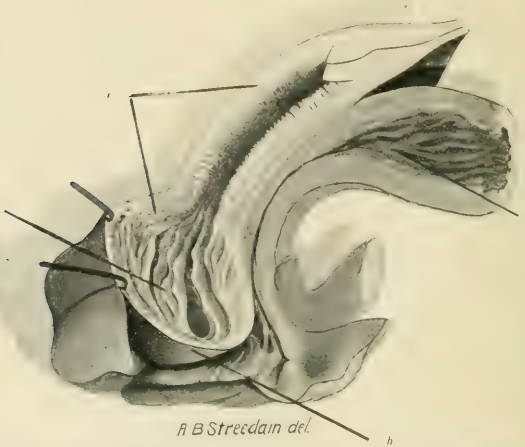
Hymen of the adult (Case 11, twenty years). Large papillæ. Rich blood supply. Numerous lymph spaces and vessels.

Fig. 6.



Sensory nerve-endings in hymen excised on account of vaginismus (from Amann): *p*, pavement epithelium surrounding a papilla, which is almost entirely filled by an enlarged end-bulb of Krause.

Fig. 7.



Genitals of a fetus of twenty-five weeks (Case 4). The longitudinal folds (*f*) of the lowest portion of the vagina (*v*) turn inward at the vaginal entrance and run parallel to the hymen (*h*), thus simulating bilamellation; *b*, bladder.

hymen of sixty-two years (Case 13), the elastic tissue is stained ad maximum after being exposed to the stain but five minutes. The network at the base of the epithelium consists of a thick, entangled mass. The elastic fibers throughout the hymen are shorter and in some places seem to have nodular swellings.

Smooth muscle fibers have repeatedly been found in the normal hymen (Savage,[15] Budin,[16] Hirst[7]). Their presence, however, is not the rule. In my specimens I found them but once, in the hymen of nineteen. In this case in the deeper layer near the vulvar side could be seen a few fibers that took the yellow color of the picric acid in Van Gieson's stain, though rather diffusely. This hymen was well formed but not unusually thick. On the other hand, the very fleshy hymen of a girl of twenty (Case 11, Fig. 5) did not contain any muscular elements. The fleshy appearance in this case was produced by an increase of connective tissue and the very rich blood supply. In certain pathologic conditions, such as atresia—congenital or acquired—smooth muscle fibers have been found with greater uniformity. Henkel[17] and v. Tussenbroeck[18] found numerous smooth muscle fibers in their cases of hymeneal atresia. In the wall of hymeneal cysts Palm[19] and Ziegenspeck[20] detected traces of smooth muscle fibers.

In order to demonstrate nerves and nerve endings in the hymen the methods of Marchi and Azoulay and the nigrosin and uran carmine methods were employed. Numerous attempts to find the structures in question proved unsuccessful. The great difficulties of staining the peripheral nervous system are well known, and failure in demonstrating the nerves should, in the first place, be referred to faulty technic. The nature of my material made it impossible for me to employ the methylene-blue method, which is supposed to give the best result. The possibility of a fault on my part, therefore, prevents me from passing a definite judgment on the question of the nerve supply of the hymen. The litera-

ture on the subject, moreover, is extremely meager. Only older reports (E. Klein,[21] Budin[16]) speak in a somewhat sweeping way of "the highly vascular and nervous mucous membrane." On the other hand, authors who have studied the nerve supply of both the internal and external genital organs since the introduction of more perfected laboratory methods (v. Gawronsky,[22] Koestlin[23]) do not mention the hymen at all, though their researches are very exhaustive otherwise. Wechsberg[85] stained an excised portion of an atresic hymen with hemalaun and eosin and found "here and there nerves in transverse and longitudinal sections." The only author who gives a detailed description of nerves in the hymen is Amann.[24] He found in two hymens excised for vaginismus Krause's terminal bulbs well developed in the papillæ (Fig. 6).

In this connection I may be permitted to speak of a number of clinical observations which I have made during the last year or two. I am aware that the value of such observations with regard to the question in hand is very limited, but I think that these investigations possess a certain interest.

As is well known, fear or anticipation of being hurt produces, in a great many women, to a certain extent, the sensation of pain. If we succeed in eliminating this psychic factor, we obtain a more objective criterion as to the presence of pain. Thus I have tried to determine the sensitiveness of the hymen with regard to mechanical and thermic irritations. If the attention of the patient be diverted, I find that one can exert pressure and even slight traction upon the intact hymen by means of a dressing forceps without causing any pain. In women after defloration in whom the hymen is well preserved aside from one or two lateral lacerations, the hymeneal lips may be pressed or pierced without pain. Neither is there any thermic sensitiveness. If the vestibule is carefully avoided, the patient cannot state whether she is touched with a hot or cold instrument. Following the experiments of Calmann,[25] who examined the sensibility of the

vagina and uterus, by means of small test tubes filled with hot and cold water, I arrived at the same results as far as the hymen was concerned. In two instances pain was caused by the slightest touch. One of these was a girl of eighteen, with an intact hymen, who suffered from pruritus vulvæ; the other was a prostitute of twenty-seven, with myrtiform caruncles, who was recently infected with gonorrhea. In these cases the sensitiveness may have been due to the pathologic condition of the genitals. From the above observations I am inclined to believe that the pain in defloration is due to the psychic condition of the individual and to the forcible dilatation of the vaginal entrance. Especially the latter seems to play an important role. In a nulliparous woman of thirty-two whose hymeneal lobes were not sensitive to touch or pressure, coition was extremely painful until a gradual dilatation of the vaginal entrance by means of tubular specula was effected. The normal dilatation by coition had not taken place on account of some anomaly on the part of the husband.

I have digressed somewhat from my subject not because I am able to bring any positive proofs about the presence or absence of nerves in the hymen, but because I think that these clinical notes make the existence of a *very rich* nerve supply rather improbable. Possibly future attempts to decide the question histologically may be more successful.

According to Kollmann,[26] in the newborn mucous glands are found in the fold between the hymen and labia minora. These glands, which are in great number in the labia minora and surround the entire vaginal entrance, are found also in the fossa navicularis in immediate proximity to the hymen, and represent simple or ramified tubules 0.3 to 0.7 mm. in length. In the hymen itself distinctly glandular structures were found by Ruge[27] and Rincheval[86] upon the inner surface in a case of atresia. Klein,[14] in the hymen of a fetus 27 cm. in length (five months), observed glandular invaginations of the epithelium of the outer surface. Such invaginations have been described by Schäfer as crypts. Similar blind ducts

were also found by Fleischmann.[28] In his case there was one, 13 mm. in length in the left side of the hymen, another in the right side 6 mm. long. The epithelium of these ducts was directly connected with that of the surface. In Piering's[29] case, small, well-filled vesicles with thin walls were found near the free edge almost completely surrounding the hymeneal orifice. Upon histologic examination these vesicles were found to be lymphectasias.

The latest and most exhaustive researches have been by R. Meyer.[30] He found six different varieties of glands or gland-like structures in the hymen of the fetus and newborn; viz.: (1) glands of the vaginal type upon the inner, vaginal side; (2) remnants of the Wolffian ducts; (3) glands or glandular tubules situated about the base of the hymen in the sulcus nymphohymenalis and in the fossa navicularis and at times extending into the base of the hymen; (4) real glands of the outer, vulvar surface; (5) invaginations of the epithelium of the outer surfaces; (6) genuine pavement cell cysts underneath the outer surface. I myself found glands in one instance. The hymen of the eight months' fetus (Case 6) had at its base a few transverse lumina of glands lined with a cuboidal epithelium. These were at some distance from the surface and showed, in several sections, no communication with the latter. No serial sections, however, were made.

Henle[31] found exceptionally "erectile tissue" in the hymen. So far as I know this observation has not yet been corroborated by others.

The elasticity of the hymen is under rare circumstances so great that it remains unruptured even at childbirth. As a rule, however, the first coition or accidents such as falling astride of an object or violent exercise will rupture the delicate membrane. The number of tears which divide the hymen into "lobes" varies in the individual case. Healing takes place with considerable new-formation of elastic and connective tissue. Very rarely such tears unite; if such should happen a cicatrix may remain.

Parturition definitely destroys the form of the hymen. Only small rests—caruncule myrtiformes—resembling warts, are left. Microscopically, the caruncle represents a compact tissue of rather conical shape and set with a few short papillæ. The caruncle of long standing (Case 15, seventy-six years) appears merely as a dome-shaped elevation whose papillæ have disappeared. The blood supply of the younger caruncle (Case 14, forty-nine years) is very rich; that of the older very scanty. The superficial layers of the epithelium are cornified and the keratinization extends into the deeper layers between the papillæ. The process of cornification is present only about the hymen and, in a very few places, in the adjoining vaginal mucosa, but not in the adjacent portion of the vestibule. The elastic tissue is greatly increased both in quantity and in the size of the individual elastic fiber, and fills almost the entire field of vision.

As to the formation of caruncles, Schröder [32] holds that the hymeneal lobes during childbirth are compressed and undergo gangrene, while Bellien[33] believes that the lacerations of the hymen, during labor, extend through the base of the membrane into the perivaginal connective tissue; cicatrization and consequent shrinking of these tears produce caruncles.

I am inclined to ascribe to the elastic tissue a certain role in the formation of caruncles. As described above, the elastic fibers are unequally distributed within the hymen, the portions nearer the base containing more and thicker fibers than the periphery. So long as the hymen is preserved in its entirety, or only torn into a few large lobes which but little alter the form of the hymen, the upper more delicate fibers encircling the hymeneal opening exert an action counter to that of the radial fibers which tend to retract toward the base. If, however, the hymen, in childbirth, is torn into a number of small pieces, each piece retracts owing to the more powerful action of the radial fibers. For some time after, one is able to pull each caruncle to its original length, but after long standing the retraction results in an atrophy

of the entire caruncle to a great extent through insufficient circulation. Regarding the retraction of elastic fibers, we know from numerous examinations that only the fibers of thin or medium size are really elastic. Thick fibers, such as are found in old age, are unyielding, and only such were observed in the caruncle referred to above.

Pathology. The pathology of the hymen may be divided into: (1) inflammations; (2) malformations; (3) neoplasms.

Inflammation of the hymen may start primarily in this membrane itself or may originate in adjacent organs and tissues. As to the latter or secondary form, it is to be expected that the hymen, as a part of the vagina, may be affected by inflammatory processes which originate in the vagina and descend toward the vaginal entrance. Thus the different varieties of colpitis, including those that are produced by affections of the uterus, may lead to inflammation of the hymen. Acute infectious diseases such as cholera, variola, scarlatina, measles, etc., not infrequently produce secondary inflammations of the entire vaginal tract and, as we shall later see, play an important role in the origin of acquired atresia. On the other hand, the inflammatory process may ascend from the vulva. Gonorrheal infection here deserves the first place. Contamination with the colon bacillus, or ascarides emigrating from the neighboring anus may cause inflammation, and irritation from lack of cleanliness produces a similar effect. The inflamed hymen has a markedly reddened appearance and bleeds easily. Occasionally small excoriations are seen. The surrounding tissues have in general the same appearance. The microscopic changes in the inflamed hymen have not as yet been studied in detail, but in analogy with similar processes in the vagina we may expect to find round-cell infiltration in the connective tissue and a desquamation of epithelium so that this layer is either very much thinner or, in places, is altogether absent.

The same pathologic conditions may, after defloration, affect the hymeneal lobes and, after childbirth, the myrtiform

caruncles. Thus, in a case of recent gonorrhea, I found the myrtiform caruncles considerably thickened, deep red in color and extremely sensitive.

Primary inflammation of the hymen is due either to masturbation or coitus. In two girls who admitted masturbation, I found the otherwise intact hymen considerably thickened, grayish-white and edematous. Gosselin[36] describes cases in which onanism led to pathologic sensitiveness of the hymen.

In some cases the hymen, though normal, is particularly rigid; in others its orifice is large enough for the introduction of the penis without laceration. In any of these cases where there is a pushing back or dilatation of the membrane, it thickens, inflames, and becomes very sensitive (Pozzi[34]). Fritsch[35] considers this rigidity of the hymen as secondary The impotent husband with a non-erectile penis or suffering from precocious ejaculation does not succeed in perforating or lacerating the membrane. The continuous insults lead to inflammation of the introitus vaginæ and hymen, and even to a purulent discharge. Inflammation of the hymen is the foremost factor in vaginismus.

It might be supposed that the specific lesions of syphilis and chancroid would occasionally be found upon the hymen. The text-books on venereal diseases, however, which I consulted, make no special mention of such an occurrence; only Veit[83] pictures a hymen whose posterior margin is destroyed by a hard chancre.

As to dermatologic affections of the hymen, recent literature contains the report of Carrière.[84] This author observed three cases of vulvitis impetiginosa in children. In these cases the major and minor lips and the hymen were, at first, reddened and swollen. After a few days, the affected parts showed an eruption of miliary vesicles which afterward opened and gave rise to small ulcerations, the latter containing staphylococci.

Traumatisms of the hymen have been extensively dealt with

by Veit.[83] The majority of injuries occur in the first cohabitation and in childbirth, and as such traumatisms must be considered physiologic, they have been spoken of in the first part of this paper on the normal anatomy of the hymen. Veit is quite right in distinguishing this class of hymeneal injuries from the severer ones produced by violent or abnormal coition. In such cases a profuse hemorrhage from the torn hymen may occur which demands medical interference. The literature on this subject is rather extensive and has been thoroughly considered by Veit. I agree with this writer that in cases of copious hymeneal hemorrhage other adjacent parts must have been injured. In one case in my recollection the young, newly married woman was brought into the clinic almost pulseless. Upon examination a deep tear of the hymen was found which commenced in the left upper quadrant and extended through the paraurethral tissue into the base of the clitoris.

Malformations of the hymen are either congenital or acquired. Total absence of hymen, reports of which are found in older literature, has not been observed by modern authors, and such authorities as Breisky[37] and Schäffer,[13] while not denying the possibility, consider this phenomenon exceedingly rare. It can, however, occur only simultaneously with total absence of the entire genital tract, which in its turn is found only in embryos incapable of surviving. In this connection I might mention as a curiosity the intentional destruction of the hymen practised in several parts of India and throughout China. Ploss[38] relates that the native nurses employ digital cleansing of the vagina in earliest childhood so thoroughly that the hymen in time disappears altogether. Thus not even the native physicians in China know anything about the existence of a hymen. Ploss himself examined a girl of European descent, but born in China, and found no trace of this structure. Similar customs resulting in the total demolition of the hymen exist among several Indian tribes in South America and certain savage nations of the Malay

Archipelago. These manipulations, however, are not dictated by a desire for cleanliness, but rather by immoral reasons.

The existence of a true double hymen—one behind the other—has not been proved. Breisky[37] saw, in two newborn females, a very thin membrane closing the lower portion of the vagina, close behind a well-formed hymen, and, furthermore, a firm septum retrohymenale in a virgin fifty-four years old. Both he and Dohrn[11] consider these septa due to a coalescence of folds of the vaginal mucous membrane immediately behind the hymen. Such a formation is facilitated, as Dohrn points out, by the fact that at this point the lumen of the vagina is narrow even previous to the appearance of the hymen. Moreover, Piana and Bassi[39] found that in this area epithelial conglutinations in the human fetus are "physiologic." We shall speak later of the hymen bilamellatus of Schäffer in reference to double hymen.

A double hymen—one beside the other—has repeatedly been found in cases of double vagina and is easily explained in the light of embryologic studies of the development of the genital tract.

In connection with these cases of *hymen duplex cum vagina septa* it must be emphasized that congenital malformations of the hymen are impossible without anomalous development of the rest of the internal genitals. This holds true especially of the most frequent form of malformation of the hymen, viz., atresia.

Nagel[8] and Veit[40] forcibly declare that only a minority of atresias of the female genitals can be considered as of congenital origin. Those of the hymen, hymen imperforatus, are found only where other parts of the Müllerian ducts are malformed. That form of hymeneal atresia which is caused by a conglutination of the hymeneal folds in utero, the rest of the genitals being normal, cannot be classified as a congenital atresia, a "vitium primæ formationis." All other cases of atresia which show a normal formation of the internal genitals—and these form the great majority—must

be considered as acquired. C. v. Tussenbroeck,[18] through the microscopic study of a case of "hymeneal" atresia, opposes this theory of Nagel and Veit. Her original publication in the Dutch language was not at my disposal, so that I had to rely on a short abstract in the *Zentralblatt für Gynäkologie* and on one of her drawings reproduced in an article by Stratz.[41] v. Tussenbroeck points out that while the normal hymen consists only of vulvar and vaginal epithelium and connective tissue between the two epithelia, her case of hymeneal atresia contained in the intermediary tissue also smooth muscle fibers and bloodvessels but showed no signs of a previous inflammation. She takes the stand that in this case no hymen has been formed and that the septum consisted, in the first place, of the lower ends of the atresic Müllerian ducts with their surrounding secondary layer of smooth muscle fibers, and, secondly, of the floor of the imperforate sinus urogenitalis. The patient, a girl of twenty-four years, possessed otherwise perfectly normal internal and external genitals.

While Stratz, Treub and Bolk expressed their agreement in the discussion following this demonstration of v. Tussenbroeck, Pincus,[42] who strongly seconds the views of Nagel, points out that the absence of signs of previous inflammation is no positive proof against the supposition of an acquired atresia, and Henkel,[17] in a similar case of hymeneal atresia, was able to show microscopically the presence of a chronic inflammatory condition and to demonstrate numerous mast cells and leukocytic wander cells.

A critical review of the numerous cases reported as congenital atresias convinces one of the strength of Nagel's theory. In the light of this theory, cases of pregnancy and childbirth with imperforate hymen are readily understood. v. Guérard[43] compiled about fifty instances of this sort from literature and added five observations of his own. This goes to prove that atresia may occur at any time in the adult. Even repeated atresias may take place. In this respect the

third case of v. Guérard is unique. The patient in the seventh month of her first pregnancy complained of intense pain in the genitals. Although she had previously been operated upon twice for atresia hymenalis, the vagina was now found completely occluded by a firm and extremely sensitive membrane. After total excision of this membrane all symptoms promptly ceased, and normal delivery took place at term.

In the majority of instances, however, the formation of atresia dates back to earlier years of life. A careful anamnesis in such cases will often reveal its cause. Neugebauer,[44] with his well-known assiduity and admirable thoroughness, has gathered almost 1000 cases of gynatresias from literature. In 479 of these cases the atresia was undoubtedly acquired. In almost 300 the anamnesis was negative. Neugebauer himself says that it would be a mistake to interpret the lack of data in the history in favor of the congenital origin of the malformation. He refers to atresias in general, and it is clear that the same reasons must pertain to hymeneal atresias. The etiologic factor is furnished either by acute infectious diseases such as were enumerated above, which lead to inflammatory processes in the genital system, or by vulvovaginitis due to gonorrhea or other causes. The inflammation subsequent to an acute infectious disease may make itself manifest at once or may remain unnoticed, as for instance in the case reported by Thienhaus.[45] In the latter event the result of the inflammation, viz., more or less firm coalescence of the hymeneal folds, will not be noticed until at puberty the menstrual flow is obstructed. Even if, at that time, signs of previous inflammation should not be found in the imperforate hymen, this would not speak against the atresia being acquired. Meyer[46] has proved from literature the acquired origin of atresia even in the absence of any scars, and Odebrecht[47] points out that cicatrices acquired in infancy completely disappear within a few years on account of increased cellular vitality. If several sisters present hymeneal

atresia, the inference is justified that the children were simultaneously affected by the same acute infectious disease. Pincus cites a very interesting case reported by Madge.[48] Four sisters, two to ten years old, had hymeneal atresia; the fifth child, a boy, had phimosis. Pincus rejected the supposition of heredity in this case and is inclined to ascribe this coincidence to the action of some obnoxious factor common to the five children, such as baths, sponges, or towels.

This somewhat lengthy consideration may be thus summarized: In all cases of hymeneal atresia with normal functionating genital system, the condition is acquired. Here the occluding membrane causes the retention of menstrual blood and leads to hematocolpos, hematometra, etc.

The literature on the histology of hymeneal atresia is not very great. The reports of v. Tussenbroeck[18] and Henkel[17] have been recorded above. A recent contribution to this subject was furnished by Wechsberg.[85] The patient, a girl aged fourteen years, had had measles, chicken-pox and whooping cough. She came to the hospital with the symptoms of hematocolpos, which an examination revealed to have been caused by an imperforate hymen. Wechsberg excised a small portion of the membrane. Upon microscopic examination both surfaces of the specimen showed papillæ, those upon the vaginal side being the larger. The vulvar surface was covered by pavement epithelium, the vaginal side by a single layer of high cylindric cells. On the vaginal side, however, there were at one point, on the outer surface of a conspicuously large papilla, evidences of keratinization. On the vulvar side, cornification was seen throughout the uppermost layers of the epithelium. Within the connective-tissue stroma there were smooth muscle fibers, numerous lymph spaces and vessels, and a few nerves. There was no round-cell infiltration nor other signs of previous inflammation such as cicatricial tissue.

Wechsberg refers to a similar case reported by Rincheval[86] in which there was found multilayered pavement epithelium

upon the outer surface, while the inner surface was lined with cylindric epithelium which in places presented glandular invaginations into the dense connective tissue.

In the observation of Kochenburger[87] the excised hymen had multilayered epithelium on its outer surface and cuboidal epithelium on its inner side. Kochenburger considered the latter to be the basal layer of the epithelium after the upper layers had been macerated by the accumulated blood in the occluded vagina and had been cast off. This epithelium resembled that found upon erosions of the portio vaginalis uteri. In corroboration of this view the upper layers of the pavement epithelium were seen to persist in some places while in others they had undergone degenerative processes, but were still in connection with the basal layers. From his findings Kochenburger deduced that in hymeneal atresia the origin of epithelial cells resembling cylindric epithelium is due to pressure, infiltration, imbibition, atrophy, and necrosis. Wechsberg, however, maintains that in his and Rincheval's cases the cylindric epithelium is primary inasmuch as no signs of cell degeneration could be detected; staining for mucous degeneration resulted negatively, and the cylindric cells themselves were high and took the ordinary stains readily. In his opinion, the differentiation of the cylindric epithelium primarily present in the vagina of the embryo into pavement epithelium had not taken place in the small portion excised. Upon the rest of the hymen and on the walls of the vagina multilayered pavement epithelium was found.

These arguments of Wechsberg in favor of an embryonal origin of the atresia in his case are not convincing. It would be strained to suppose that only the very small portion which was excised should have remained in an embryonal state. Nor is the absence of degenerative signs sufficient proof. I believe Kochenburger is right in comparing this condition with the erosion of the portio vaginalis uteri. In this affection, after the upper layers have been destroyed by the pathologic

process and have entirely disappeared, only the basal layer remains, the cells of which under the irritating influence may be stimulated to more excessive growth of size and length. They even invade the underlying tissue, forming the so-called glands of erosion, and I am inclined to ascribe a similar origin to the glandular formations mentioned in Rincheval's case.

Neoplasms of the hymen are very rare. To this group belong the cysts. I found in literature a total of 17 cases of hymeneal cysts reported by Bastelberger,[49] Döderlein,[50] Piering,[29] Ziegenspeck,[51] [20] Müller,[52] Goerl,[53] Ulesko-Stroganowa,[54] Palm,[19] [56] Marchesi,[55] Lannelongue and Achard,[57] Theilhaber,[58] and Ricci.[59] These cysts occur on either side of the hymen, but more frequently on the outer surface. They may attain the size of a cherry and are occasionally multiple. Ulesko-Stroganowa's case presented one cyst on either side. In the case of Ricci, there was a small cyst in the wall of the larger cyst. In Ziegenspeck's third case two smaller cysts were found at the base of the main cyst. Piering observed a number of very small transparent cysts around the edge of the hymen. Microscopically, the hymeneal cysts have been carefully studied. On the outside they are covered with the hymeneal epithelium. Beneath this lie layers of more or less dense connective tissue with well-developed papillæ and numerous capillaries, in some cases combined with smooth muscle fibers. The inner surface is lined with epithelium, usually of the pavement variety, varying in thickness. In other cysts the epithelium has a more cuboidal or even cylindric character (Marchesi). This variation depends upon the source of origin, which we shall presently consider. The cysts may contain detritus and epithelium, or a homogeneous, yellowish-brown, jelly-like substance, or else a watery fluid. The latter may consist of lymph fluid (Piering), or may contain blood corpuscles (Ulesko-Stroganowa). Ricci's cyst, the size of a cherry, which he so carefully examined, contained 1 c.c. of a thick, dark-brown

liquid, the microscopic examination of which revealed epithelial cells in large number, detritus of blood corpuscles, fat droplets, glossy masses of amber color apparently consisting of red corpuscles and fat drops, and a small amount of hematic pigment.

Cysts of the hymen may develop in four different ways, viz.:

1. By invagination and separation ("Abschnürung") of hymeneal epithelium (cases of Bastelberger, Ziegenspeck, Goerl).

2. From rests of embryonal tissue within the substance of the hymen. This mode of origin is claimed by Ricci for his case. He cites the observation of Pestalozza,[9] who found ectodermal embryonal rests within the stroma of a hymen.

3. By conglutination or coalescence of converging hymeneal folds. This mode was first suggested by Döderlein, who observed a pronounced development of folds upon the outer side which in places approximate. When the tips of these folds become completely conglutinated, a space is shut off, which at first is filled with epithelial cells. By gradual necrosis and liquefaction of the central cells a lumen is formed and a cyst produced. Döderlein's view is strongly supported by Schäffer.[13] According to this writer, the folds of the embryonal hymen are usually obliterated by the upward growth of the connective tissue. In many instances, however, these folds coalesce at the end of the papilla, thus leaving a pocket of epithelium. One of my own specimens shows that fibrous bands may extend from any point of the papilla to the hymen and separate a mass of epithelium which may eventually give rise to a cystic cavity (Fig. 2).

4. By retention of contents: (*a*) In lymph spaces (Piering); (*b*) in portions of the Wolffian ducts within the hymen. In the report of Ulesko-Stroganowa and in one of Marchesi's cases, the cysts were lined with cylindric epithelium similar to that of the Wolffian ducts; (*c*) of a sebaceous gland. Palm considers his two cysts as true atheromata. This author

bases his views upon the macroscopic and microscopic similarity to genuine atheromata found in other parts of the body, mainly the labia minora, and upon the supposition that the few true glands which have been found upon the inner and outer side of the hymen (Ruge, Klein) are of a sebaceous character.

Of other benign neoplasms of the hymen I have found two observations of polypus[61] and one case of angioma.[62] The original articles, however, I could not obtain.

Of malignant diseases of the hymen there exists in literature but one case of sarcoma reported by Sänger.[63] A child of three years had a profuse foul vaginal discharge, and occasionally a tumor of the size of half a finger appeared at the entrance of the vagina. From the vulva hung two bodies like mucous polypi, pediculated from the posterior hymeneal border. There was a still larger tumor with ulcerated surface, distending the vagina and sessile on the anterior wall. There existed, in addition, a number of polypoid excrescences, like hydatids, occupying various portions of the vaginal membrane, and numerous metastases in the broad ligaments and the rectovaginal septum. Microscopically the tumor proved to be a typical round-cell sarcoma.

Development. Four theories of the development of the hymen have been advanced which may be briefly characterized as follows:

1. The hymen is the product of the Müllerian ducts (Kölliker, Dohrn, Nagel, Klein).

2. The hymen is the product of the sinus urogenitalis (Pozzi).

3. The hymen is the product of both the Müllerian ducts and the sinus urogenitalis (Schäffer).

4. The hymen is the product of the Wolffian ducts (Hart).

I begin with the last and chronologically latest theory which is advanced by D. Berry Hart,[64] [65] but was in somewhat similar form published by v. Hoffmann[66] in 1878. Hart formulates his theory as follows: The hymen is formed by

a special bulbous development of the lower ends of the two Wolffian ducts aided by an epithelial involution from below of the cells lining the urogenital sinus. The terminal parts of the Müllerian ducts are at first solid epithelial cords, the epithelial mass being derived from the bulbous termination of the Wolffian ducts. These Wolffian bulbs after having mapped out the vaginal portion of the uterus and the fornices of the vagina, coalesce, break down in the center and form the lumen of the vagina. The coalesced Wolffian bulbs, then protrude into the urogenital sinus and thus form the hymen. The epoöphoron, the paroöphoron, and the Wolffian ducts near the uterus and upper part of the vagina are all useless and dangerous relics to women, giving rise to many pathologic conditions simple as well as malignant. Only at the lower end of the Wolffian ducts do we get an actual normal utilization in the development of the hymen, the relining of the vagina and cervix with an ectodermic multilayered epithelium and the opening up of the imperforate eminence of Müller where the Müllerian ducts end blindly.

This theory was accepted by Keith[67] and Garrigues[68] and seems to be supported by a case of persistence of the urogenital sinus recorded by Purslow.[69] This case is interesting enough to be quoted more in detail. A well-developed girl aged twenty-three years sought medical aid for dysmenorrhea. Micturition was always normal. The pubic hair was well developed. On separating the labia, there was seen an unusually well-marked hymen having a crescentic opening in front, which would admit the index finger. Immediately within the hymen, but quite distinct from it, was a firm fibrous ring contracting the opening into the vagina, and just admitting the tip of the little finger; but the finger could not be forced through this narrowed part of the canal, which gave the impression of being about 1 cm. in length. A catheter passed through the hymeneal opening readily into the bladder, and urine was withdrawn. The clitoris was not enlarged. The constriction, together with the hymen, was divided by

deep incision with a bistoury, and the orifice was well stretched until it would admit three fingers. It was then ascertained that the constricted portion communicated at its upper end with a capacious vagina, and that at the junction the bladder opened by an aperture which admitted the tip of the finger and appeared to have very little sphincter power. There was no trace of a urethra. In this report there are several important points of information lacking. From the history we do not know whether the patient in her childhood had suffered from any acute infectious disease which might have led to inflammation and consequent stricture of the vagina. What was the condition of the uterus and appendages? Was the dysmenorrhea due to a malformation of the internal genitals, or did it cease after the operation?

In Hart's theory there are several weak points. In the first place, it is difficult to understand that an organ should form an intrinsic part of the human economy only at its lower end while the rest forms a dangerous anomaly. Secondly, systematic researches of other investigators result in an altogether different conception of the course of the Wolffian ducts. Until recently the majority of observers believed that the Wolffian ducts terminated at or near the cervix uteri in the upper part of the vagina. This view can no longer be held. Beigel, Dohrn, and v. Ackeren first described rests of the Wolffian ducts along the entire length of the vagina, and Klein,[70] in 1897, demonstrated in serial sections the course of the Wolffian ducts at either side of the vagina and the termination of these ducts in the hymen. These sections were taken from the genitals of the newborn and of a girl, aged four and one-half years. The findings of Klein were confirmed by many observations of Meyer[30] in the fetus and newborn. He found in seventeen cases larger remnants of the Wolffian ducts in the vagina and especially within the hymen. Here the ducts entering the base of the hymen from the posterior wall of the vagina run upward within the hymeneal tissue and usually open at the outer side near the

free edge. It must be noted that v. Ackeren, Meyer, Klein, and Groschuff, Seitz and Hengge, the last three working with Klein, actually found the Wolffian ducts *within* the hymen. Nagel suggests that the ducts of Bartholin's glands might be mistaken for the Wolffian ducts and I feel inclined thus to interpret the pictures given by Hart.

While Hart holds that the vagina is derived only in its upper two-thirds from the Müllerian ducts and in its lower third from the sinus urogenitalis, all other theories have as their premise that the vagina in its entirety is of Müllerian origin.

According to the next theory, that of Pozzi,[34] the origin of the hymen is intimately connected with that of the vulva. On either side of the sinus urogenitalis and below the urethra lie two corpora spongiosa which, after surrounding the meatus urinarius, extend upward to the base of the clitoris. From the superficial portion of these spongious organs which remain in the fetal state, the hymen develops. Pozzi bases his theory upon the aspect of the external genitals and the analogy with the frenulum in masculine hypospadias, and upon the following clinical observations: (1) the existence of the hymen in total absence of the vagina; (2) the presence of a single hymen in cases of double vagina; (3) the existence of a urethral hymen—*i. e.*, a prolongation of the ring around the meatus, partly or even entirely covering this orifice, which goes to prove the close relationship between the different parts of the hymen and the ring which surrounds the meatus.

Cases of hymen existing in the absence of the vagina are occasionally found. In addition to those cited by Pozzi himself and by Neugebauer,[44] I have seen in recent literature reports by Loefqist[71] (ten cases), Krevet,[72] and Strauss.[73] On the other hand, in the majority of cases of total absence of the vagina, no trace of a hymen can be found. Loefqist himself does not consider his cases as supporting the theory of Pozzi who, as he points out, ignores the results of embryologic studies altogether and thus denies facts verified by the

microscope. In my opinion the microscopic examination of the atresic vagina or rather of the tissues behind the hymen will possibly throw light upon this point. The vagina must either have been normal and become obliterated afterward or have been atrophic from the beginning. At any rate, the Müllerian ducts must have reached the sinus, for otherwise the origin of a hymen is inexplicable. In corroboration of this, absence of the hymen in absence of the vagina is the more frequent occurrence. An example is to be seen in the case recorded by Veit[83] in which there was a uterus bipartitus, but no trace of the vagina nor of the hymen could be found. Even according to Pozzi's theory, the hymen is only then formed from the vulva when there exists an opening which the corpora spongiosa can surround. Pozzi's second argument of the presence of one hymen in double vagina is balanced by observations of double hymen in double vagina. Only last year two further cases were observed by Benno Müller[74] and Marchand.[75]

As to Pozzi's third point, the existence of a membrane partly or totally occluding the urethra may be admitted as of vulvar origin but need not necessarily be associated with the formation of the hymen. According to a recent article by Dickinson,[82] this "urethral hymen" is a pathologic structure due to repeated traction and found only in company with hypertrophied nymphæ. In addition to these remarks, a case of persistent sinus urogenitalis reported by Kelly[76] is worthy of note. The patient, a nullipara, aged forty-six years, had normal external genitals as far as the introitus of the vagina, where the only opening between the rectum and clitoris was found. There was no hymen, and the smooth orifice beneath the pubic arch had the form of a transverse slit. From this orifice a short muscular canal led directly into the bladder. Into this canal behind the orifice a double vagina opened. It is at this point, at the opening of the Müllerian ducts into the sinus, that a hymen should be looked for, though Kelly does not make mention of it. The absence of an external

hymen speaks strongly against Pozzi's supposition. In conclusion, Pozzi does not bring sufficient evidence to prove the fact that the hymen is independent of the Müllerian ducts.

Schäffer,[13] upon a careful study of an unusually large material, propounds the following theory: In the fifth month of fetal life every hymen makes its appearance more or less distinctly in the form of two lamellæ (hymen bilamellatus) in such a way that the inner lamella is formed by the vagina, the outer by the vulva. Schäffer found this mode of origin 53 times in 190 specimens. In many instances the two lamellæ unite either at once or later; in more than one-fourth of his cases, they persisted more or less until full term, but rarely after birth. Each lamella is covered with mucous membrane on both sides so that the hymen bilamellatus, properly speaking, consists of four layers. Schäffer supports his theory with the following observations: (1) frequency of a distinctly bilamellate form (28.8 per cent.); (2) unity of the outer lamella with a layer of vulvar mucosa around the urethral orifice and upward to the clitoris; (3) different stages of the coalescence of the two lamellæ by means of transverse processes or papillæ; (4) folds or ridges of mucosa which spring from the frenulum labiorum, the nymphæ, and the "frenulum masculinum," and end in the outer lamella, usually at or near the free edge; (5) relation of the urethral orifice to the outer lamella; (6) difference in the form of the free edge of the outer and inner lamellæ; (7) difference in color and epithelial covering of both lamellæ; (8) possibility of dissecting the outer lamellæ from the inner; (9) analogy with the portio vaginalis uteri, the growth of which is, to a great extent, due to material furnished by the vagina; (10) cases of single hymen in double vagina; (11) cases of persistence of both lamellæ (hymen duplex); (12) cases of presence of hymen (outer lamella) in absence of vagina.

The painstaking researches of Schäffer deserve earnest consideration. A number of his observations coincide with

those of Pozzi. The extension of the hymen beyond the urethral orifice, in Schäffer's description, corresponds to Pozzi's "bride masculine" or "frenulum masculinum." The relation of the meatus urethræ, the folds from the surrounding vulva stretching to the outer surface of the hymen and the possibility of dissecting the superficial layer of the vulvar mucosa *in toto*, including the outer surface of the hymen, are observations common to both authors. Only the interpretation of these facts and the conclusions drawn therefrom are different. This is most noticeable in the arguments classified under 10 and 12.

There are several objections, however, to Schäffer's theory:

1. Schäffer states that in the first series of 103 fetuses, 42 had abnormal genitals. In a second series of 87 cases he gives no detailed data; altogether he found hymen bilamellatus 53 times in these 190 specimens. The large percentage of cases with abnormal sexual organs in addition to the comparatively small percentage of bilamellate hymens actually found, to a certain extent detracts from the value of these observations.

2. While a number of text-books (Gebhard,[77] Chrobak and Rosthorn[78]) reproduce Schäffer's statements without commenting upon them, later workers in the same field emphasize that they have not yet seen the bilamellate form in a single instance. I refer to Klein[14] and Hart.[64] Nor have I been able to observe this formation in the seven fetal hymens of my collection. Since Schäffer found the bilamellate hymen in 28.8 per cent., one would expect to find it at least once in the dozen or more cases examined by Klein, Hart and myself. In only one instance, that of a girl, aged twenty years, I thought at first sight to have noted a case of hymen duplex (persistence of the two lamellæ). The hymen was well developed and of annular shape. Immediately behind the hymen there was a second, well-marked, fleshy fold springing from the left side of the vaginal entrance and running parallel to the left half of the hymen. At about the median line this

fold began to converge slightly toward the hymen and ended in its posterior surface a little to the right of the median line. This fold was as high as the hymen itself and exactly like it in appearance. After cautiously pushing aside the hymeneal membrane it was seen that this fold was but the continuation of a longitudinal vaginal ruga which ran directly below the juncture of the posterior and left walls of the vagina. These longitudinal folds or rugæ are of ordinary occurrence in the lowest inch of the vagina. Fig. 7 (Case 4) shows this condition in an embryo of twenty-five weeks. Hart[64] also notes that the rugæ or columns of the lowest inch of the vagina run for the most part longitudinally; above this the vagina has its rugæ transverse. These longitudinal folds (Fig. 7) turn inward at the vaginal entrance and run parallel or but slightly converging to the posterior surface of the hymen and fuse with the latter at irregular points, but, as a rule, below the free edge,

3. As the first formation of the hymen takes place in the nineteenth week, and as the lamellæ, according to Schäffer, persist more or less distinctly until term, the bilamellate form should be visible, at least remnants of it, in microscopic sections through hymens of a later fetal period. None of my sections, however, present this form. Moreover, the hymen of twenty-five weeks, pictured in Fig. 7, which simulates bilamellation, does not, microscopically, show two lamellæ, though the section comprises vulvar and vaginal portions adjoining the hymen. With Klein I consider the high fold usually found at the vaginal side as one of the numerous papillæ of the vagina and without importance in regard to the development of the hymen.

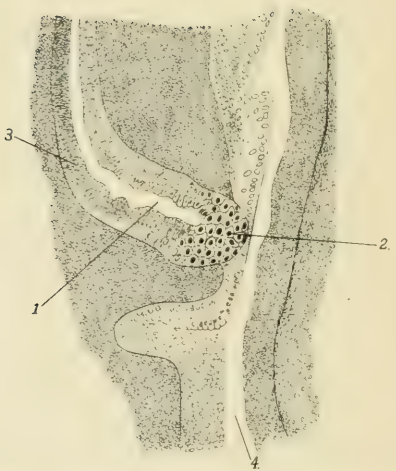
4. Schäffer mentions the difference in color and epithelial covering of the two surfaces. While I shall speak later of the epithelial coverings of the two sides of the hymen, I may say as to the difference in color that in the fetus I observed the entire hymen, both inside and outside, as white, exactly like the vagina, and contrasting markedly with the grayish-

red appearance of the vulva. I observed a similar condition in the hymen of a virgin of twenty-five.

Klein,[4] in his studies of the development of the hymen, advances the following theory: The hymen is that part of the pelvic floor which is thinned out by the ampullary enlargement of the lower portion of the vagina. The anlage of the hymen is present at the beginning of the third month when the Müllerian ducts break through into the sinus urogenitalis. From the third to the fifth month, the vagina undergoes an ampullary enlargement in its terminal portion, which in its turn leads to a stretching and thinning out of the surrounding pelvic floor. I might suggest that this theory does not explain the formation of the annular hymen. It is only the posterior wall of the vagina which undergoes a dilatation thus producing the ampulla vaginæ; the anterior wall remains unaffected and, consequently, a symmetric structure like the annular hymen is impossible.

Klein ascribes to the Müllerian ducts an active part in the formation of the hymen. In this respect, Klein's views coincide with the most generally accepted theory, that advanced by v. Kölliker,[79] v. Mihalkovicz, Budin, Dohrn, and especially Nagel.[8] According to these writers the development of the hymen is inseparable from the development of the vagina. In the human embryo of 8 to 10 mm., the Müllerian duct on either side may be divided into a proximal and a distal part characterized by different kinds of epithelium. The proximal portion, which later becomes uterus and tube, is hollow and has cylindric epithelium. The distal part, which becomes the vagina, has, in the beginning, no lumen, but is filled with large protoplasmic cells of a more cubic form. At about the third month, the lower ends of the Müllerian ducts in their downward growth reach the sinus urogenitalis and by the protrusion of their blind ends form the Müllerian eminence. From this eminence the hymen is formed. The finer details of this process may, to my mind, be conceived as follows. When the united Müllerian ducts

Fig. 8.



Sagittal section through the lower third of the Mullerian duct in a fetus 4 cm. in length (from Nagel): 1, Mullerian duct; 2, lower end of the same (anlage of the vagina); 3, cylindric epithelium of the anlage of the uterus; 4, canalis urogenitalis.

reach the sinus urogenitalis they push the thin layer of epithelium lining the sinus forward, and by so doing they make this epithelium even thinner than before. This condition is clearly seen in Nagel's picture (Fig. 8). In this stage the lower ends of the Müllerian ducts represent a somewhat cone-shaped solid epithelial cord. The formation of a lumen proceeds from above downward, and this canalization corresponds with the curve of the ducts themselves with its concavity anterior. Therefore the point where the lumen of the ducts breaks through the solid end is, as a rule, nearer the upper border of the conus, and so is responsible for the production of the semilunar form of the hymen which is by far the most common. The concave course of the Müllerian ducts is due to the curved abdomen of the embryo. Thereby every organ in the lower part of the body, the sacrum, rectum, genital tract, and sinus urogenitalis, acquires a curved axis. The extremity of the conus (Müllerian eminence) with a more or less eccentric lumen protruding into the sinus, consists, at first, only of the epithelium of the Müllerian eminence covered on the outer surface with a very thin layer of sinus epithelium. Only secondarily is this mass of epithelium invaded by connective tissue. According to Nagel the Müllerian ducts originally are composed of large protoplasmic cells of an epithelial character. Around this mass of cells which gradually becomes a tube, the mesodermal formative cells are grouped in a circular arrangement, thus forming the first anlage of the connective tissue and muscular layer of the Müllerian ducts. In other words, the connective tissue appears after the ducts are established and grows in proportion to, and together with, the downward growth of the ducts. Thus, when the ends of the ducts protrude into the sinus in the form of an epithelial protuberance, their connective tissue comes down with them, grows into the terminal conus and forms the inner or central layer of the protuberance.

If this be the true mode of origin, the hymen is a product of the Müllerian ducts exclusively. The epithelium of the

sinus urogenitalis does not play any active part, but only covers the outer layers of the epithelium of the Müllerian ducts in the form of a very thin cuticle. Thus it is readily understood why the epithelium of the vulva can be dissected from the hymen as recorded above in connection with the theories of Pozzi and Schäffer.

The Müllerian theory is further supported by the following observation. It is asserted by a number of authors (Winckel,[80] Dohrn,[11] Pozzi,[34] Roze[81] and others) that the outer surface of the hymen is different from the inner and resembles the structure of the vestibule in that it has, like the latter, no papillæ and that its epithelium is like that of the vestibule. My sections, however, described above, show that the vulvar surface has papillæ as well as the vaginal surface, and I infer the same from Schäffer's remarks on this subject. In my sections, the papillæ, it is true, are not quite as numerous nor are they as high and richly ramified as those on the inner side, but this difference is but comparative, and can be explained by physical reasons. The hymen in the embryo and in the infant, as all observers agree, protrudes into the vulva. It thus lies in close juxtaposition to the vestibule and its papillæ are subjected to a certain degree of pressure atrophy while the vaginal surface does not suffer any pressure from the yielding epithelium which at that time fills the vaginal lumen.

The vestibule itself has no papillæ at all; its surface in the vicinity of the hymen is perfectly smooth. It is covered with but a few layers of flattened epithelium while the vulvar surface of the hymen is lined with many layers of epithelium. The slight difference in the number of epithelial layers between the vulvar and vaginal surfaces of the hymen is, again, explained by the same physical reasons. These conditions are strikingly obvious in the section through the vulva, hymen, and vagina, of an embryo of twenty-five weeks (Fig. 1), detailed above. In another section through the hymen of a seven months' fetus the epithelium on the vaginal side is very

thick; that on the vulvar side is only about half as thick. This latter epithelium appears compressed; the cells adjoining the germinative basal layers are markedly flattened instead of being polygonal, as is usually the case in multilayered pavement epithelium.

I am well aware that the form of epithelium, because of its changeability, cannot establish a theory, but it can support views which are otherwise well founded. Embryologic studies and macroscopic or clinical observations alone cannot decide the question. It must be supported by histologic examination, the value of which has thus far been underestimated. Under this heading I should like to call attention to certain features of the connective-tissue structure which to my knowledge have not heretofore been pointed out. In all sections examined the fibers of connective tissue are distinctly seen to run in a straight line from the vagina into the hymen. Account of this was given in the first part of this paper. It may here suffice to reiterate this observation. The great mass of the hymen appears as a direct continuation of the connective tissue of the vagina, and only at the base a few semicircular fibers connect the hymen with the stratum of the vulva. The latter can by its looser structure be differentiated from the more compact vaginal and hymeneal connective tissue and so clearly shows the hymen to be of vaginal origin.

Bibliography.

1. C. G. Cumston. On the Significance of the Hymen Intactus. Annals of Gyn. and Ped., Jan., 1904.

2. Krimer. Hufeland's Journal, Sept., 1834; cited by Pozzi.

3. E. B. Turnipseed. Some Facts in Regard to the Anatomic Differences between the Negro and White Races. Amer. Journ. of Obst., 1877, vol. x, p. 32.

4. C. H. Fort. Some Corroborating Facts, etc. Ibid., p. 258.

5. H. O. Hyatt. Note on the Normal Anatomy of the Vulvovaginal Orifice. Ibid., p. 253.

6. A. G. Smythe. The Position of the Hymen in the Negro Race. Ibid., p. 638.

7. B. C. Hirst, in Clinical Gynecology, edited by J. M. Keating and H. C. Coe, 1895, p. 244

8. W. Nagel. Entwickelung und Entwickelungsfehler der weiblichen Genitalien. Veit's Handbuch der Gynäkologie, 1897, Band 1.

9. Bischoff. Abhandl. der K. Bayr. Akad., 1879; cited by Pozzi.

10. C. J. Cullingworth. A Note on the Anatomy of the Hymen, etc. Journal of Anatomy and Phys., 1893, vol. xxvii.

11. F. A. R. Dohrn. Die Bildungsfehler des Hymen. Zeitschr. f. Geb. u. Gyn., Bd. 11.

12. A. v. Kölliker. Manual of Human Microsc. Anatomy, 1860, p. 465.

13. O. Schäffer. Bildungsanomalien der weibl. Geschlechtsorgane, etc. Arch. f. Gyn., 1890, Bd. 37.

14. G. Klein. Entstehung des Hymen. Wien, 1894.

15. H. Savage. The Female Pelvic Organs, 1876, p. 3.

16. Budin. Recherches sur l'hymen et l'orifice vaginal. Prog. Méd., Aug., 1879, p. 677.

17. Henkel. Tr. Gyn. and Obst. Soc., Berlin. Zeitschr. f. Geb. und Gyn., 1901, Bd. 45, S. 175.

18. C. van Tussenbroeck. Tr. Dutch Gynec. Soc. Zentralbl. f. Gyn., 1900, No. 19, S. 506.

19. R. Palm. Eine Hymenalcyste, etc. Arch. f. Gyn., Bd. 51.

20. R. Ziegenspeck. Ueber die Entstehung von Hymenalcysten. Arch. f. Gyn., Bd. 67.

21. E. Klein, in S. Stricker's Manual of Human and Comparative Histology, 1872, vol. ii. p. 321.

22. N. v. Gawronsky. Ueber Verbreitung und Endigung der Nerven in den weibl. Genitalien. Arch. f. Gyn., 1894, Bd. 47.

23. R. Koestlin. Die Nervenendigungen in den weibl. Geschlechtsorganen. Fortschritte der Medicin, 1894, No. 11–12.

24 J. A. Amann, Jr. Lehrbuch der Mikrosk.-Gynäk. Diagnostik, 1897, S. 35.

25. A. Calmann. Sensibilitätspruefungen am weibl. Genitale. Verhdl. der Deutsch. Ges. f. Gyn., 1897, ix, S. 526.

26. J. Kollmann. Lehrb. der Entwickelungsgesch. des Menschen, 1898.

27. C. Ruge. Cited by Breisky.

28. Fleischmann. Eine Bildungsanomalie des Hymen. Zeitschr. f. Heilk., 1886, Bd. 7, S. 419.

29. O. Piering. Zur Kenntniss der Cystenbildung im Hymen. Prager Med. Wochenschr., 1887, S. 409.

30. R. Meyer. Ueber Drüsen der Vagina bei Föten und Neugeborenen. Zeitschr. f. Geb. u. Gyn., 1901, Bd. 46.

31. Henle. Cited by Pozzi.

32. Schröder. Schwangerschaft, Geburt u. Wochenbltt; cited by Schauta. Lehrb. d. ges. Gyn., 1897.

33. Bellien. Arch. f. Gyn., Bd. 6, S. 132.

34. S. Pozzi. Medical and Surgical Gynecology. Amer. Transl., 1894.

35. H. Fritsch. Krankheiten der Frauen, 1901.
36. Gosselin. Hyperaesthésie Vulvaire. In Clin. de la Char., 1873, vol. ii; cited by Pozzi.
37. A. Breisky. Diseases of the Vagina. Cyclopedia of Obst. and Gyn., 1887, vol. x.
38. H. Ploss. Das Weib in der Natur und Volkerkunde. 1899, Bd. 1, S. 197.
39. Piana and Bassi. Rivista Clinica di Bologna, Nov. 1874; cited by Schäffer.
40. J. Veit. Erkrankungen der Vagina, in Handbuch der Gyn., 1897, Bd. 1, S. 282.
41. C. H. Stratz. Blutanhäufungen bei einfachen und doppelten Genitalien. Zeitschr. f. Geb. u. Gyn., Bd. 46, S. 1.
42. L. Pincus. Praktisch wichtige Fragen zur Nagel-Veit'schen Theorie. Samml. klin. Vortr., 1901, No. 299–300.
43. v. Guérard. Schwangerschaft und Geburt bei undurchbohrtem Hymen. Centralbl. f. Gyn., 1895, S. 402.
44. F. v. Neugebauer. Zur Lehre von den angeborenen u. erworbenen Verwachsungen. Berlin, 1895.
45. O. Thienhaus. Atresia Hymenalis. Journ. Amer. Med. Assoc., July 20, 1901.
46. R. Meyer. Zur Aetiologie der Gynatresien, etc. Zeitschr. f. Geb. u. Gyn., Bd. 34.
47. Odebrecht. Discussion. Zentralbl. f. Gyn., 1894, S. 126.
48. Madge. Tr. Obst. Soc., London, vol. xi. p. 213; cited by Pincus.
49. Bastelberger. Cyste im Hymen. Archiv. f. Gyn., Bd. 23, S. 427.
50. Döderlein. Ein Fall von angeborener Hymenalcyste. Arch. f. Gyn., Bd. 29, S. 284.
51. R. Ziegenspeck. Ueber Cysten im Hyemn Neugeborener. Archiv f. Gyn., Bd. 32.
52. Müller. Ein Fall von angeborener Hymenalcyste. Archiv f. Gyn., Bd. 44.
53. Goerl. Cyste im Hymen einer Erwachsenen. Archiv f. Gyn., Bd. 42.
54. Ulesko-Stroganowa. Zur Pathologie der Hymenal und Vaginalcysten (russ.). Monatschr. f. Geb. u. Gyn., Bd. 2, S. 269.
55. P. Marchesi. Sulle cisti imenali. Arch Ital. di Gin., 1900; cited by Ricci.
56. R. Palm. Beitrag zur Entstehung der Cysten im Hymen bei Erwachsenen. Archiv f. Gyn., Bd. 53.
57. Lannelongue et Achard, cited by M. G. Marion. Les kystes du vagin. Gaz. des Hôpitaux, Fevr. 1, 1902.
58. Theilhaber; cited by Ziegenspeck.
59. A. P. Ricci. Sulle cisti dell' imene. Archiv. Ital di Ginec., April 30, 1902.
60. E. Pestalozza. Contributo alla studio della formazione dell' imene. Annali d'Ost. e. Ginec., 1901; cited by Ricci.

61. D. C. Gunénier. Deux observations de polypes de la membrane de hymen. J. de la sect. méd. de Soc. Acad. Loire-Inf., Nantes, 1837, vol. xiii, p. 309.

62. Vascular Excrescence on the Hymen. New Jersey M. Reporter, Burlington, 1850, vol. iii. p. 5–7.

63. M. Sänger; cited by Breisky.

64. D. Berry Hart. Morphology of the Human Urinogenital Tract. Journ. of Anat. and Phys., 1901, vol. xxxv. p. 330.

65. D. Berry Hart. The Development of the Urinogenital Tract. Brit. Med. Journ., Sept. 13, 1902.

66. v. Hoffman. Tr. Germ. Gyn. Soc., 1878. Transl. in American Journal of Obstetrics, 1879, vol. xii. p. 205.

67. A. Keith. Human Embryology and Morphology, London, 1902.

68. H. J. Garrigues. Diseases of Women, 1900.

69. C. E. Purslow. Persistence of the Urogenital Sinus. Brit. Med. Journ., Oct. 3, 1903.

70. G. Klein. Ueber die Bezeihungen der Müller'schen zu den Wolff'schen Gangen beim Weibe. Verhdl. der Deutsch. Ges. f. Gyn., 1897, vol. ix. S. 163.

71. R. Loefqist. Ausgebildeter Hymen bei Defect der Vagina. Mittheil. aus der Gyn. Klin. v. Engström, Bd. 4, Heft 3.

72. Krevet. Castration bei fehlender Schiede. Zeitschr. f. Geb. u. Gyn., 1901, Bd. 46, S. 39.

73. Strauss. Münchener med. Wochenschr., 1904, No. 4, S. 177.

74. B. Muller. Ein Fall von Vagina duplex und Hymen duplex. Deutsche med. Wochenschr., 1903, No. 32, S. 570.

75. F. Marchand. Ueber Verdoppelung der Vagina bei einfachen Uterus. Zentralb. f. Gyn., 1904, No. 6, S. 161.

76. H. A. Kelly. Operative Gynecology, 1899, vol. i. p. 288.

77. C. Gebhard. Pathol. Anatomie der weibl. Sexualorgane, 1899.

78. Chrobak und v. Rosthorn. Die Erkrankungen der weibl. Geschlechtsorgane, 1900, Bd. i.

79. A. v. Kolliker. Entwickenunggeschichte, 1879; cited by Klein.

80. F. v. Winckel. Diseases of Women. Amer. Transl., 1887.

81. Roze-Michel. L'hymen. Thèse de Strassbourg; cited by Schäffer.

82. Robert L. Dickinson. "Urethral Labia" or "Urethral Hymen." Pathologic Structures due to Repeated Traction. American Medicine, Feb. 27, 1904, vol. vii. No. 9.

83. Veit. Die Erkrankungen der Vulva. Handbuch der Gynäkologie, Bd. 3, Heft 1.

84. Carrière. Bulletin Médicale, Dec. 27, 1902; Rev. Annales de Dermatologie et de Syphilographie, Nov. 1903.

85. L. Wechsberg. Zur Histologie der hymenalen Afresie der Scheide. Wiener klin. Wochenschr., 1903, No. 43.

86. Rincheval. Dissertation, Würzburg, 1889; cited by Wechsberg

87. Kochenburger. Zeitschrift f. Gyn., 1893; cited by Wechsberg.

THE CONTRAINDICATIONS OF THE ELECTIVE CESAREAN SECTION.

Report of Eight Cases.

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Probably no subject in obstetrics has attracted more attention within recent years than has the Cesarean operation. As in the case of any new operation, or rather in this instance the resurrection of an old operation, it has been received with great enthusiasm as the solution of all the various problems of difficult labor, and its supporters have gone so far as to say that from now on destructive operations on living children for the sake of the mother should be considered as almost criminal, since we have now an easy method of saving the fetal life at a very slight risk to the mother, provided the operation is performed under proper surgical conditions. The unprejudiced observer, judging merely from the literature on the subject, may well wonder whether in the face of the many indications which have been brought forward to justify an abdominal delivery no contraindications exist, and whether every woman with a pelvic obstruction or in whom gestation is complicated by a central implantation of the placenta or by eclampsia is a fit subject for a Cesarean section.

Although it is not possible to lay down absolute rules which must be followed in any surgical procedure, there are always certain fundamental principles which underlie

the success or failure of any operation, and it is my object in this paper to define as clearly as possible the conditions which contraindicate the performance of the elective Cesarean section, basing my conclusions as far as possible on my personal experience in eight cases and on the results of other operators in cases which I have had an opportunity of observing.

The Cesarean section is primarily indicated as an operation for the preservation of fetal life under such conditions as render the birth of a living child by the natural passages impossible or at least improbable. It is not warranted in place of a destructive operation for a dead child unless the obstruction to delivery is such as to render the passage of the pelvis impossible or excessively dangerous to the maternal life. If the indications lead to the conclusion that an abdominal delivery for the sake of the child will probably be performed at the expense of the mother's life, whereas another operation will save the mother at the sacrifice of the fetal life, the Cesarean section becomes an unjustifiable operation, since the mother's life should always be considered as the more important of the two and should never be needlessly jeopardized.

There seem to be certain conditions which enter largely into the determination of the degree of danger to the mother in any given case, and it is of the utmost importance to recognize clearly what these elements of danger are. A careful study of the fatal cases which have been reported leads directly to the conclusion that there are contraindications to an abdominal delivery which are not generally regarded, especially since fatal cases continue to occur, although the general consensus of opinion among those qualified to judge is that the dangers attendant on an elective Cesarean section should be very little greater than in an exploratory laparotomy.

The great majority of patients in regard to whom the question of an abdominal delivery is raised can be divided

into two distinct classes: those which are favorable, and those which are unfavorable for a Cesarean section. The conditions which must be fulfilled to place a patient in the favorable class for operation are: the absence of any suspicion of uterine infection no matter how slight; the absence of any signs of exhaustion, whether general or local, and whether dependent upon labor or upon severe efforts at extraction of the child; the absence of any intercurrent disease; and the ability to procure proper conditions for the performance of the operation and efficient after-care. The converse of any of these conditions should transfer the patient at once to the unfavorable class, even though in a certain small proportion of cases this may involve an unnecessary sacrifice of the child, since the mother should not be subjected to an undue risk.

Uterine Infection. That uterine infection should be considered as an absolute contraindication to an elective Cesarean section is a proposition which is so generally conceded at the present time that very little discussion is necessary. The general surgical principle that the opening of a septic cavity into the clean peritoneum is to be carefully avoided when any other operation is possible is as true of the infected uterus as of any abscess cavity. Although the intestines can be protected by careful walling off with gauze, the large amount of infected liquor amnii which is usually present renders some contamination of the peritoneum almost inevitable, and the alternative of deliberate sacrifice of the child should be unhesitatingly selected, if the child is still living. If, however, no other operation is possible—*i. e.*, if an absolute pelvic indication is present—the uterus should be extirpated after the delivery of the child instead of being closed and returned to the abdominal cavity to act as a source of general infection.

Exhaustion. The element of exhaustion as a contraindication to the performance of an elective Cesarean section demands the most careful attention, since this is the factor

which is most often neglected in the study of the individual case, and is probably responsible for a larger proportion of the unfortunate results than any other complicating condition.

Exhaustion in its relation to rendering a patient unfit for an abdominal delivery must be considered from a dual standpoint—*i. e.*, general exhaustion from prolonged or excessive labor, or from severe efforts at the extraction of the child, and local exhaustion—*i. e.*, exhaustion of the uterus as evidenced by rigidity of the uterus between contractions and by irregularity of the previously rhythmical contractions.

That general physical exhaustion furnishes a definite contraindication to an abdominal delivery is a proposition that needs little exposition, since it is evident that a woman whose vitality has already been reduced to a low ebb is in no condition to be subjected to the added strain of an extensive abdominal operation for the sake of a child whose vitality has probably suffered to an almost equal degree. The indication in these cases must always be for the method of delivery which will add least to the strain the patient is under, even at the expense of the fetal life.

Severe efforts at the extraction of the child have also a double influence on the choice of operation, since not only is the mother's power of resistance reduced by prolonged or violent efforts at extraction, but also the child's vitality is affected to an even greater degree, and the chances of securing a living child and thus meeting the primary indication for an abdominal delivery are reduced to a minimum. It must be admitted, however, as a general principle that judicious efforts at extraction offer no contraindication to a subsequent abdominal delivery, but the margin of safety is an extremely narrow one and very accurate judgment is called for, since each futile attempt at pelvic delivery increases the risks for both patients to a certain degree.

Local exhaustion—*i. e.*, exhaustion of the uterus, is of

equal importance, to say the least, as a contraindication to a Cesarean section, and it is in regard to this important element that errors in the choice of operation are most liable to be made. It has been the fortune of the writer to observe two cases in the hands of other operators in which the uterus was already showing signs of distress when the abdominal delivery was decided on, in that the uterine muscle was already in a state of tonicity as evidenced by distinct rigidity between pains and by beginning irregularity of the contractions. In both of these instances the uterine incision was closed with considerable difficulty owing to the rigidity of the muscular wall. Both patients subsequently died of general peritonitis. In one case the abdominal incision was opened after death and the examination of the uterine wound showed that some of the sutures had cut out or given way under the tension induced by the rigid muscle, allowing the lochia free access to the peritoneal cavity with a resulting peritonitis. There is no reason to doubt that a similar result took place in the other case. These two cases have impressed me very strongly with the feeling that unrecognized uterine exhaustion is one of the greatest dangers to be feared in the elective Cesarean section. This effect of uterine exhaustion furnishes a strong argument in favor of the performance of Cesarean section on a selected date before the advent of labor or at any rate as early in labor as possible, since I am convinced by repeated experiences in operative deliveries that uterine exhaustion, at least as demonstrated by the presence of a contraction ring, is a phenomenon which may be found comparatively early in labor and is not, as is commonly taught, a late manifestation of labor. In fact one of the patients cited above gave a history of having been in moderate labor for not more than fourteen hours, and except for the uterine rigidity was apparently in perfectly good condition for an abdominal delivery.

Exhaustion, then, whether general or local, must be con-

sidered as a strong factor in deciding against an elective Cesarean section, and when clearly defined should be regarded as furnishing as definite a contraindication as should septic infection of the uterus. It is extremely difficult to formulate a rule as to the exact degree of exhaustion which may be present and still allow of the performance of a Cesarean section, but for practical purposes it may be said that a patient whose pulse has permanently reached a rate of 90, or at most 100, or in whom tonicity of the uterus has developed, as evidenced by beginning rigidity of the uterus between pains, and by irregularity in the rhythm of the previously regular contractions, should be considered as no longer a favorable subject for an elective Cesarean section, with the qualification that if the exhaustion has reached a point where the mother's condition is considered hopeless and the child is still alive, an abdominal delivery is indicated for the sake of the child.

Prolonged Labor. The influence of prolonged labor, *per se*, on the choice of operation is a question which calls for careful consideration. The real question is, however, rather what effect labor has had upon both patients than how long a time has elapsed since the beginning of labor, or, in other words, what signs of exhaustion are present. It is very commonly stated that patients who have been in labor more than twenty-four hours are not to be included among the cases favorable for operation, but this is too general a rule to be allowed to pass unqualified. If labor has been active from the beginning, there is very little doubt but that the average patient will by the end of twenty-four hours, and most probably at a somewhat earlier period, begin to show more or less marked evidences of exhaustion, either general or local, and it is rather in relation to these signs than in the relation to the mere length of labor that the question of operation must be decided. Case VI. of the ensuing list had been in labor for nearly thirty hours at the time I first saw her, and on this ground alone might well

have been classed as an unfavorable case. Labor had, however, been very slight from the beginning, there were no signs of general exhaustion present, the pulse was little, if any, more rapid than at the beginning of labor, and the uterus was perfectly soft between contractions; in other words, the patient was in as good condition as at the beginning of labor and there was no contraindication to operation, except the length of labor. Operation was decided upon in spite of the prolonged labor, and the patient made a perfectly satisfactory recovery. This is perhaps a somewhat exceptional case from the fact that labor had had so little apparent effect, and one case is not enough on which to base any definite conclusions; but it serves to illustrate the point that prolonged labor is not enough in itself to render a patient necessarily an unfavorable subject for an abdominal delivery, and that in the absence of any untoward symptoms a good result may be confidently expected even in those who have been in labor more than the prescribed twenty-four hours.

There is one other factor which must be considered in relation to Cesarean section after a prolonged labor and that is the possibility of an incipient infection of the uterus which has not yet given rise to symptoms. If the patient has been subjected to an undue number of vaginal examinations, or if any suspicion attaches to the asepsis with which these examinations have been conducted, the element of a possible uterine infection must be taken into consideration, and, if a reasonable doubt exists, an abdominal delivery must be ruled out as an operation of election. Here, too, it is not a question of an uncomplicated prolonged labor which influences the choice of operation, but the suspected presence of one of the definite contraindications.

There is little doubt, however, but that the average patient who has been in labor over twenty-four hours has ceased to be a favorable case for operation on account of the supervening conditions; and if a rule has to be made, the twenty-

four-hour limit is sufficiently ample, but the length of time *per se* is not an element of danger.

Intercurrent Diseases. It may be laid down as a general principle that Cesarean section is not well borne in eclampsia or in any other intercurrent disease which tends to lower materially the general power of resistance of the patient.

Surrounding Conditions. There can be no doubt but that the circumstances under which the patient is placed and the surgical skill which is at her command should have a serious influence on the choice of operation. The conditions which will do most to ensure a favorable result are those which appertain to any first-class surgical hospital, and the more nearly the surroundings of the patient approximate these the more favorable the outlook. A favorable result may, however, be expected if the ordinary aseptic precautions can be observed during the operation, and if efficient after-care can be provided. Unless these conditions are fulfilled the patient will have a better chance of recovery after a difficult pelvic delivery than after a laparotomy.

In addition to the patient's environment the operative skill at her command must be taken into consideration. It is generally considered that the Cesarean section is an operation which requires great technical skill while anyone is fit to perform the most difficult obstetric operations. As a matter of fact, however, the Cesarean operation requires much less technical knowledge than the ordinary obstetric operations, and is not to be compared with the more difficult ones, which are distinctly specialist operations. For this reason a well-equipped surgeon, who is not a trained obstetrician, will be sometimes justified in performing an abdominal delivery in the face of meager indications, or of what would be contraindications to a trained obstetrician, and give both of his patients a better chance than if he attempted a difficult pelvic delivery.

The ordinary indication for the performance of the

Cesarean section is the presence of some obstruction to delivery whether this obstruction be due to pelvic contraction, to new-growths which encroach on the pelvic canal, or to the excessive size of the child. The obstructive indication has been so thoroughly discussed as to be well recognized among competent obstetricians, but the importance of its early recognition has not yet been thoroughly impressed on the general practitioner. It is not an uncommon thing to be called to see a patient in consultation, who has been in labor for from twenty-four to forty-eight hours or even longer, and who is showing marked signs of exhaustion, and to have considerable difficulty in convincing the family physician that the patient is in no condition to stand an abdominal delivery and that the child must be disregarded. The old-fashioned teaching is still in the ascendant among the average general practitioners not to interfere with nature even to learn when she is not doing her work properly until the failure of the patient's condition forces some action. The position of the consultant in these cases is a most difficult one, for he must bear the burden imposed by the ignorance of the attendant and do what he can to save one or both patients, with the knowledge that an early diagnosis would have made his task an easy one. This condition is certainly a deplorable one and calls for constant effort to overcome the traditions of obstetrics, which can only be accomplished by time. Craniotomy on living children and symphysiotomy should be obsolete operations, but until the patients with obstruction to delivery are recognized early they must have a definite place in operative obstetrics.

The discussion of the various conditions which are included in the obstructive indications is too extensive to be included in this paper and I propose to omit their further consideration and to devote the remainder of the paper to a brief discussion of the two obstetric complications—complete placenta prævia and eclampsia—in relation to the performance of a Cesarean section in their treatment.

Placenta Prævia. The proper treatment of complete placenta prævia is a subject which has always called forth serious discussion even among expert obstetricians; the question as to how far the rights of the child may be allowed to compromise the chances of the mother being always one of great interest and one which can only be settled by the personal equation of the individual operator. Until quite recently no other question was raised than whether version and immediate delivery in the interests of the child prejudiced the mother's chances to an unjustifiable extent as compared with a version, traction on a leg to tampon the os, and slow delivery, a method which practically always sacrifices the child. Of late, however, the performance of a Cesarean section in cases of complete placenta prævia has found many warm advocates, though it must be admitted that these are usually to be found rather among the general surgeons than among the trained obstetricians. The principal argument of the supporters of the abdominal route in the treatment of placenta prævia is that the mortality among the children delivered by the pelvic route is overwhelming while the maternal statistics are not perfectly satisfactory.

A careful study of the reports published in regard to the results of treatment in placenta prævia leads to certain interesting conclusions. When a patient has been in competent hands under careful observation, the diagnosis is almost invariably made early as soon as the initial hemorrhage has called attention to the possibility of placenta prævia, and immediate delivery is instituted with almost uniformly good results as far as the mother is concerned, and much better results as regards the child than the published statistics of cases in general point to. When the diagnosis is not made early and the vitality of both patients has been sapped by recurring hemorrhages, the results are naturally very much worse.

The question to be decided is whether an abdominal delivery offers a better chance for either patient than a

pelvic delivery. If the operation is performed early with the patient in good condition, the result as far as the mother is concerned will not be materially different no matter which route is preferred, providing the operator is competent; but the abdominal route certainly offers no advantages for the mother and a slightly greater risk. As regards the child, it must be remembered that the diagnosis of the condition is usually to be made at some part of the eighth month and that a considerable fetal mortality is inevitable at this period of development, and it is not susceptible of proof at present that the results of abdominal delivery will be better than those of pelvic delivery in cases where the child is in good condition at the beginning of operation, and in the hands of a good operator.

If, however, the patient has been allowed to have repeated hemorrhages, the performance of a Cesarean section is closely analogous to an operation on a patient in a state of exhaustion and offers greatly increased dangers to the mother for the sake of a child whose vitality has suffered more or less seriously from the maternal loss of blood and whose chances of life are distinctly problematical. It has been urged that Cesarean section for placenta prævia should be considered as in the same category with abdominal section for extrauterine pregnancy; but in the latter case the hemorrhage can only be safely reached and controlled by the abdominal route, whereas in the former the hemorrhage can be controlled by another operation which in a large proportion of cases will prove a safer one. It is probable, however, that a well-equipped surgeon who is not a competent obstetrician will have better results from an abdominal delivery, and in certain cases this must influence the choice of operation, although the result will probably be an increase in the maternal mortality over what an equally competent obstetrician would obtain by the pelvic route without a commensurate gain in the saving of fetal life.

There are, however, certain rare cases in which Cesarean

section must be the operation of election. When an absolute pelvic indication is present, the complication of the condition by complete placenta prævia can have no influence on the choice of operation. In the extremely rare cases when the complete placenta prævia occurs in the presence of such extreme rigidity of the cervix as to resist all safe attempts at dilatation, and hemorrhage is profuse, the abdominal route must be selected, but marked rigidity of the cervix is very uncommon in placenta prævia and is in any case seldom found except in primiparæ among whom complete placenta prævia is very rare.

Eclampsia. The elective Cesarean section is urged by some writers as an operation deserving a distinct place in the treatment of eclampsia on the ground that in certain cases the mother's chances will be improved if she is delivered by a rapid abdominal operation rather than subjected to a long and difficult pelvic delivery. Halbertsma, in 1889, advocated its trial in cases which presented such extreme rigidity of the cervix that dilatation was sure to be very tedious and difficult and attended by a serious degree of shock, and the subject has been under more or less constant agitation ever since, but the results have not been particularly favorable.

In accordance with the contraindications discussed at the beginning of this paper, no patient who presents evidences of a serious intercurrent disease is a favorable subject for a Cesarean section and eclampsia must certainly be considered under that heading. Whether we agree with Stroganoff that eclampsia is an acute infectious disease which runs a self-limited course, and advise purely expectant treatment, unless in the exceptional case, or adopt the more common view that it is a toxemia from some unknown source, though dependent on the pregnant state, the fact must be admitted that an unnecessary laparotomy is to be avoided.

Stroganoff reports 58 consecutive cases of eclampsia treated by purely medical treatment without mortality.

If we follow his lead Cesarean section need never be considered in the treatment of eclampsia. My own experience with the Stroganoff treatment has not been so encouraging, resulting in a loss of 4 out of 12 cases, or a rather higher rate of mortality than the average in eclampsia treated by immediate delivery, and I have come to the conclusion that in the majority of cases immediate delivery will give the best results, unless the patient can be put under efficient treatment from the beginning of her symptoms. Admitting that delivery is called for in many cases, the question is, "Is Cesarean section a justifiable method of treatment?" I have found reported 73 cases of Cesarean section in eclampsia with 39 deaths, or approximately 54 per cent.

At first glance a mortality such as this would rule out any operation, but it must be remembered that these were desperate cases and the mortality would be considerable under any method of treatment.

Personally I believe that the absolute pelvic indication is the only justification for abdominal delivery in eclampsia, and that, too, when labor has already commenced, or in the event of failure to control the convulsions by purely medical treatment, when the patient is not in labor.

In all other cases I believe that a pelvic delivery is indicated even at the expense of the fetal life. The only justification for an abdominal delivery that could possibly be considered in these cases is such extreme rigidity of the cervix that dilatation, even by means of a powerful mechanical dilator, is so nearly impossible as to induce so profound a degree of shock that the patient will die as a result of the operation, and I believe that the patient's chances will be better under purely medical treatment, or after multiple incision of the cervix followed by delivery, than if she is subjected to an abdominal delivery, although my conclusions are not based on any personal experience.

Case I.—Mrs. T. E., aged thirty years; American; married; fourth pregnancy.

Personal History. First pregnancy, March 2, 1895. Stillborn at term; high forceps. Second pregnancy, February 22, 1896. Stillborn; induced labor at seven months. Third pregnancy, February 27, 1897. Stillborn; induced labor at seven months; high forceps.

Pelvic measurements: Spines, 22 cm.; crests, 24 cm.; external conjugate, 17½ cm.; estimated true conjugate, 9 cm.

Present Illness. Entered Boston Lying-in Hospital October 15, 1899, for Cesarean section on selected date. Calculated date of labor October 20. Careful abdominal and general preparation.

Operation, October 17, 1899. Cesarean section. Uterine incision closed with silk. Abdominal wall with silkworm-gut. No vaginal drain. Placenta found lying under incision.

Child; male; 8 pounds. O.D.P. Good condition.

Convalescence normal, except for temperature of 101.5° on third day. Relieved by removal of clots from uterus by curet. Nursed baby, which gained well. In bed three weeks. Mother and child discharged well.

Case II.—Mrs. F. S. M., aged twenty-nine years; American; married; first pregnancy. Referred by Dr. C. L. Scudder.

Personal History. Hip disease at four years. Left hip stiff.

Present Illness. Last catamenia May 4, 1900. Calculated date of labor February 10, 1901.

Examination under ether. Left leg three inches shorter than right. Marked tilting of pelvis.

Measurements. Spines, 21 cm.; crests. 24 cm. Symphysis deviated one inch to left of median line. Non-development of left side of pelvis, which is perfectly flat, on internal examination. Moderate exostosis on inner surface of symphysis, and another in region of right sacroiliac synchondrosis. Right side of pelvis slightly overdeveloped and roomy. Left leg can be flexed to right angle, but not abducted at all. Operative pelvic delivery obstructed by stiff leg.

Entered Baptist Hospital February 7, 1901. Preparation started at once. Labor began at 6 A.M., February 8, with rupture of membranes. Fair labor with dilatation of os to two inches by 10 A.M. Head not engaged. Position O.L.A.

Operation 10 A.M. Cesarean section. Uterine incision closed with silk. Abdominal wall with silkworm-gut. No vaginal drain. Convalescence uneventful, except for slight phlebitis on right side during second week. In bed four weeks. Discharged well one week later. Could not nurse.

Child, female; weight 5 pounds 12 ounces at birth. Fed on modified milk. Discharged, gaining well.

CASE III.—Mrs. G. T. M., aged twenty-eight years; American; first pregnancy. Referred by Dr. Frost, of Brockton.

Personal History. Hip disease at four years with shortening of right leg and loss of abduction.

Present Illness. Last catamenia January 3, 1901. Calculated date of labor October 10, 1901.

Examination under ether.

Measurements. Spines, 22½ cm.; crests, 22 cm.; right oblique, 19 cm.; left oblique, 18½ cm. Symphysis deviated to right. Right side of pelvis flattened without compensatory enlargement of left side. To enter Boston Lying-in Hospital October 6th for Cesarean section.

Labor began September 27, 1901, at 10 P.M., with rupture of the membranes.

Entered Brockton Hospital. Seen at 6.30 A.M. September 28th after eight and one-half hours of hard labor. Os two-thirds dilated. No engagement of head through considerable moulding. No signs of exhaustion present. Position of child O.L.A.

Operation. Cesarean section. Uterus closed with silk. Abdominal wall with silkworm-gut. No vaginal drain. Good convalescence.

Child, male; 8½ pounds. In good condition; nursed.

Mother in bed three weeks. Both discharged well, October 25th.

Case IV.—Mrs. A. H.; colored; aged twenty-seven years; first pregnancy.

Entered Boston Lying-in Hospital in labor at 8 A.M., August 29, 1901, with os one-third dilated. Said to have been in labor twelve hours.

Examination. Head presentation, O.L.A. very high. Membranes not ruptured. Palpation showed small baby. Uterus soft and acting well. Labor moderate. On account of race and small size of child decided to apply test of labor.

Measurements. Crests, 22 cm.; spines, 21½ cm.; external conjugate, 17 cm.; estimated true conjugate, 8½ cm.

At 3 P.M. os fully dilatable. Presenting part still very high. No apparent moulding. Ether examination showed posterior fontanelle closed. Anterior fontanelle very small. No telescoping of bones. Impossible to force head into pelvis. Cesarean section decided upon. Emergency preparation under ether.

Operation. Cesarean section. Uterine incision closed with silk. Abdominal wall with silkworm-gut. No vaginal drain.

Normal convalescence. Nursed baby. In bed three weeks. Baby, female; weight, 5 pounds 11 ounces. Head almost completely ossified. September 30th, both discharged well.

Case V.—Mrs. N. B., aged twenty-four years; American; first pregnancy. Referred by Dr. Paine of Brockton.

Personal History. Negative.

Present Illness. Last catamenia May 20, 1901. Calculated date of labor February 25, 1902.

Measurements. Crests, 27 cm.; spines, 24½ cm.; external conjugate, 17 cm.; true conjugate, 8 cm.; anteroposterior diameter of outlet, 7 cm.; bis-ischial diameter, 7½ cm. Perineal body practically absent. Rectum separated from vagina only by a thin septum. Cesarean section advised.

Entered Boston Lying-in Hospital February 18, 1902. Careful preparation. Cesarean section performed February 21st, before labor began. Uterine incision closed with silk. Abdominal wall with silkworm-gut. No vaginal drain. Normal convalescence. Nursed baby. In bed three weeks. Baby, male; weight, 7½ pounds, did well. Both patients discharged well March 21, 1902.

Case VI.—Mrs. R. M., married, aged thirty-four years; Russian; first pregnancy.

Entered Boston Lying-in Hospital September 30, 1902, about noon. Labor said to have begun at 8 A.M. Pains far apart and slight. No dilatation. It was thought that she would deliver herself and she was not reported.

Previous Illness. Hip disease in childhood; right side.

Examination. Right leg one inch short. Slight tilting of pelvis. No deviation of the symphysis.

Measurements. Crests, 26 cm.; spines, 23½ cm.; external conjugate, 20 cm.; internal conjugate, 10 cm. Narrow pubic arch. Narrow outlet. Bis-ischial diameter, 7¾ c.m.

Transferred to my service October 1st. Labor still slight. Os 1½ inches. Membranes unruptured. Uterus soft between pains. Examination under ether. Marked flattening of the right side of the pelvis with no compensatory enlargement on the left. Head presenting O.D.P. Free above brim. Resting on and overlapping symphysis. Not to be forced into brim. Cesarean section determined upon in spite of long labor (about twenty-eight hours). Emergency preparation.

Operation. Cesarean section. Uterine incision closed with silk. Abdominal wall with silkworm-gut. No vaginal drain.

Normal convalescence. Nursed baby. In bed three weeks. Baby, female; weight, 7½ pounds. Both discharged well October 31st.

Case VII.—Mrs. S. H., married, aged twenty-eight years; colored; third pregnancy.

Personal History. First pregnancy. Cesarean section after eighteen-hour labor by Dr. George Haven, February 5, 1895. Abdominal wall broke down and silk sutures from uterus were discharged through sinus.

Second pregnancy. Cesarean section before advent of labor by Dr. C. M. Green, March 16, 1901. Peritoneal cavity not opened, being entirely shut off by adhesions. Good recovery.

Present Illness. Entered Boston Lying-in Hospital August 5, 1903. Preparation for operation started at once. Labor began at 3 A.M. August 7th. Very slight but painful.

Operation. At 9 A.M., August 7th. Cesarean section. General peritoneal cavity not opened. Uterus closed with silk. Abdomen with silkworm-gut. No vaginal drain.

Normal convalescence. Not enough milk to nurse. In bed three weeks. Baby, male; weight, 6 pounds 12 ounces. Both discharged well.

CASE VIII.—Mrs. M. D. B., married, aged twenty-eight years; Irish; fourth pregnancy.

Personal History. First labor, breech extraction; stillborn. Second labor, high forceps; stillborn. Third labor, miscarriage at three months.

Present Illness. Last catamenia November 16, 1902. Calculated date of labor August 23, 1903.

Measurements. Crests, 23 cm.; spines, 22 cm.; external conjugate, 17½ cm.; internal conjugate, 3½ inches.

Entered Boston Lying-in Hospital August 17, 1903. Careful abdominal preparation.

Operation. Cesarean section August 20, 1903. Patient not in labor. Uterine incision closed with silk. Abdominal wall with silkworm-gut. No vaginal drain.

Convalescence normal. Baby nursed. In bed three weeks. Baby, male; weight, 8 pounds. Both discharged well September 20th.

VAGINAL CYSTS.

By Thomas S. Cullen, M.B.,
Baltimore.

Vaginal cysts have long been recognized and accorded a very thorough consideration. Among the more important contributions on this subject are the articles of Breisky, v. Winckel, Freund, Veit, Stokes, Gebhard and Bandler. In vol. vii of the *Johns Hopkins Hospital Reports* Ernest Stokes gave a careful résumé of the literature and reported 11 cases. Since that time many new specimens have been received so that the total number examined at the hospital, including those reported by my colleague, Stokes, amounted to 53 on January 1, 1904. In order to facilitate a satisfactory consideration of the subject it may be well to speak briefly of (1) the gross and histologic anatomy of the normal vagina; (2) the embryonic structures that may persist in the vagina; (3) changes in the vagina incident to vaginitis; (4) changes due to injuries resulting from childbirth; (5) alterations in the vagina caused by perineal operations; (6) the relation of the urethra to the vagina.

1. The Normal Vagina. The lining of the cavity is composed of several layers of squamous epithelium, of which the more superficial near the outlet tend to become horny. The deepest layer which rests on the underlying stroma, consists of cells cuboidal or low cylindric in type. The stroma is made up of fibrous tissue poor in cell elements, but as a rule with a well-developed blood supply. Small tufts of the stroma project up into the epithelium producing the so-called papillæ. The vaginal mucosa resembles very closely the normal skin. The pigment in the deep layers is, however, usually wanting.

Vaginal Glands. The existence of vaginal glands has been much questioned, but v. Preuschen in 1877 after a careful examination of 36 bodies found definite vaginal glands in 4. The necks of these glands are lined by squamous epithelium, while the deeper portions, which spread out into definite bays, are lined by cylindric epithelium on which cilia may be detected. Opening into the dilated glands are little crypts. Similar glands had previously been noted in 1870 by Hennig. In Path. No. 955, where we were dealing with a small cyst 6 mm. in diameter and lined by one layer of cuboidal epithelium I found a small oval gland space lined by one layer of high cylindric epithelium (Fig. 1). It closely resembled a cervical gland and was surrounded by a definite inflammatory zone.

We were unable to tell whether the cyst was situated in the anterior or posterior vaginal wall.

In Path. No. 5593 there was a complete tear of the perineum and situated in scar tissue were two minute vaginal cysts lined by squamous epithelium. In the vicinity could be seen an almost circular nest of cells with oval vesicular nuclei. In this mass of cells were two definite gland spaces around which the cells appeared to be cuboidal or low cylindric in type. We were at a loss to explain the presence of this group of cells, particularly as they were situated in the posterior vaginal wall, where a complete tear existed. They were too far away from the rectum and surrounded by too broad a zone of fibrous tissue to have originated in any way from the bowel. Furthermore, their appearance did not suggest any relationship to rectal epithelium.

From the foregoing there seems to be no doubt that vaginal glands exist in a moderate percentage of patients.

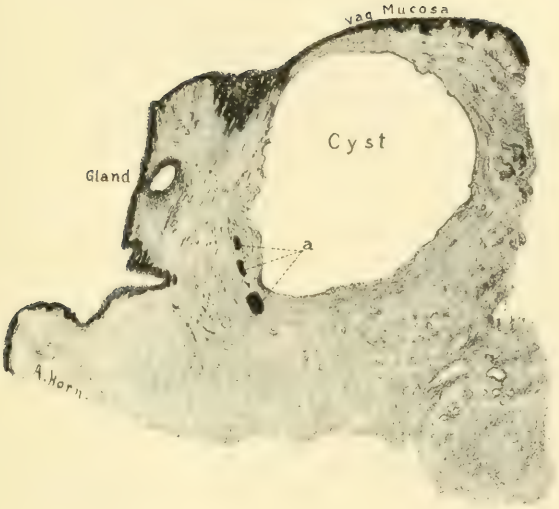
2. Embryonic Structures that may Persist in the Vagina.

(*a*) Gärtner's duct.

(*b*) Remains of Müller's duct.

(*c*) Misplaced ureter.

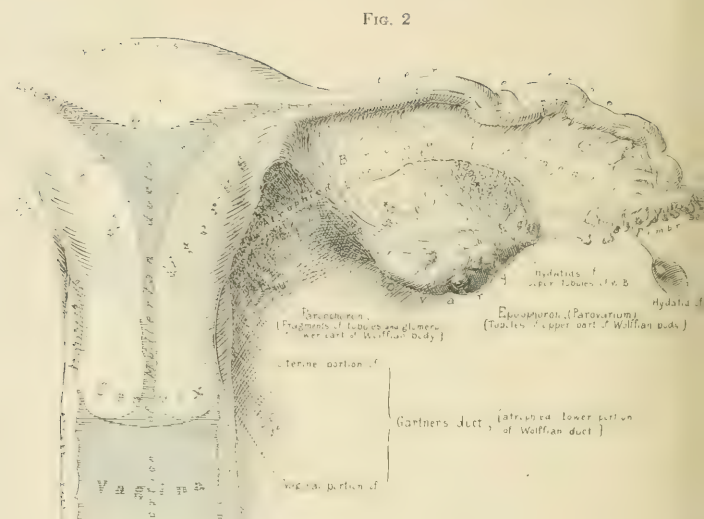
Fig. 1



A vaginal gland. (Magnified 10 diameters.)

Gyn. Path. No. 955. Lying beneath the slightly atrophic mucosa is a vaginal cyst, 6 mm. in diameter. Immediately beneath the vaginal epithelium is a small gland. This was lined by high cylindric epithelium resembling that of a cervical gland. The dark areas (*a*) represent small masses of normal vaginal epithelium.

FIG. 2


Hydatids of upper tubules of fig. B
Hydatid of
Parovarium
(Fragments of tubules and glomeruli of upper part of Wolffian body)
Epoöphoron (Parovarium)
(Tubules of upper part of Wolffian body)
Uterine portion of
Gartner's duct
(atrophied lower portion of Wolffian duct)
Vaginal portion of

A schematic illustration of the formation of the uterus, the tubes, and the vagina, and of the relation of the Wolffian and Gartner's ducts to the broad ligament, uterus, and vagina.

The outer portions of Muller's ducts form the Fallopian tubes. The middle portions unite to form the uterus and the distal portions form the vagina. In the broad ligament between the tube and ovary we see the epoöphoron, or parovarium, composed of many corkscrew-shaped tubules and communicating along the upper extremities with the collecting duct. They represent the tubules of the upper part of the Wolffian body. Lying embedded at the inner side of the hilum of the ovary are fragments of tubules and glomeruli of the upper part of the Wolffian body. In the drawing Gärtner's duct can be traced obliquely down through the broad ligament into the uterus near the internal os. It can be followed through the outer portion of the cervix to the vagina. As a rule, the vaginal, uterine, and inner broad ligament portions disappear.

(*a*) *Persistence of Gärtner's Duct.* In the embryo remains of the Wolffian body are recognized as the parovarian tubules situated between the tube and ovary. The duct is continued downward through the broad ligament along the side of or in the substance of the uterus as Gärtner's duct. It lies in the substance of the cervix near its outer side and then extends down the anterior or lateral wall of the vagina nearly to the outlet (Fig. 2).

Although it is sometimes possible to trace the duct nearly its entire length in the human being, as a rule only the upper portion is visible and this in time usually disappears. The structure is best studied in the cow, as in this animal the duct is easily traced. Bland Sutton gives a very good illustration of Gärtner's duct extending down the side of the cervix and in the lateral wall of the vagina, forming two distinct cystic dilatations.

Remnants of Gärtner's duct are sometimes recognized as one or more disconnected segments following the usual course of the duct along the lateral wall or roof of the vagina to the cervix. In some instances it has been possible to trace the duct from the vagina up to the parovarium. In other words, in these cases it was patent for its entire length.

A cross-section of the duct will show an outer covering of fibrous tissue, a middle zone of non-striped muscle arranged longitudinally, transversely or running in both directions and an inner lining of one layer of cuboidal or cylindric epithelium.

(*b*) *Remains of Müller's Ducts in the Vagina.* In some instances Müller's ducts fail to meet. We then may have two uteri and two vaginæ. In other cases the ducts are separate in their upper portions and partially unite at the cervix.

Thus we may have a bicornate uterus with two cervices and two vaginæ or a bicornate uterus with one cervix and one vagina. Other minor variations resulting from failure of Müller's ducts to unite occur, but we are here chiefly interested in a variety where one uterus is fairly well developed,

while a second is represented by a rudimentary cord or a very imperfectly formed organ. The corresponding vagina becomes fused with the lateral wall of the well-developed one. Secretions accumulate in this rudimentary vagina until it resembles a cystic tumor springing from the lateral wall of the vagina (Fig. 4). Sometimes its accompanying uterus has been fairly well developed and may communicate with it. In these cases the retained menstrual flow distends the blind vaginal pouch, and when the sac is opened it is found filled with a chocolate-colored fluid. Sometimes the tension becomes so great that eventually a small opening forms and the fluid escapes through the vagina. Such sacs may also become infected before they open. Attention to these rudimentary vaginæ situated in the wall of a well-developed vagina was directed by W. A. Freund in 1877. In his paper he reported several such cases. Kleinwachter shortly after Freund's article reported similar instances.

(c) *Abnormal Relation of the Ureter to the Vagina.* When the ureter is in its normal situation its relation to the vagina is not an intimate one, but occasionally a case is met with in which in one lateral wall a small cystic prominence is detected, from which when opened an escape of urine takes place. In other rare instances a fistulous opening into the lateral vaginal wall has been found through which there was a constant discharge of urine. Where any history of injury to the vagina is excluded, which could possibly have caused a fistulous opening between the normal ureter and the vagina, we are probably dealing with an embryonic abnormality. The latter alternative is more probable where there is a double ureter on the one side. Broedel and others have pointed out that where two ureters and two kidneys exist on one side the ureter from the lower kidney is usually inserted at the normal site, while the one connected with the upper kidney is carried down farther with the Wolffian duct and is inserted more medialward and nearer the inner urethral orifice. It would only be necessary for this second ureter

FIG. 3

A crosssection of the uterus near the cervix, showing Gartner's duct on each side of the uterine cavity (fetus at end of third month).

The uterine cavity is represented by a long slit lined by several layers of epithelium Gartner's ducts are situated well toward the outer side of the uterus, are circular and lined by one layer of cuboidal epithelium The uterine muscle is not as yet well differentiated.

FIG. 4.

Rudimentary vagina in the wall of a well formed vagina.

A schematic illustration of a blind vaginal pouch due to imperfect union of Muller's ducts. The left uterus is well developed and its corresponding vagina perfectly formed The right uterus is rudimentary and its cervical portion is represented by a solid cord The vagina is seen as a blind cystic pouch. Such cavities may collapse, but if distended contain quantities of exfoliated squamous epithelium.

Fig. 5 Fig. 6.

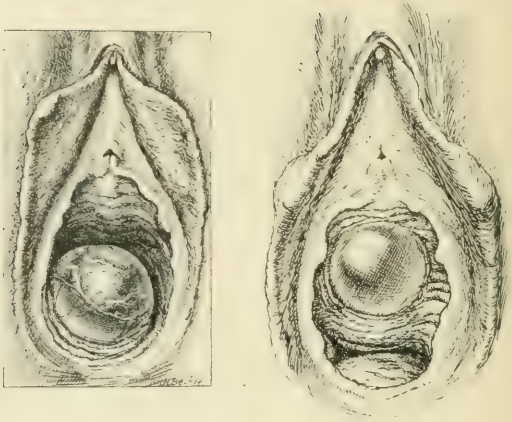


Fig. 5.—A vaginal cyst occurring three years after repair of a perineal tear.

Gyn. Path. No. 1504. This cyst contained clear fluid and was lined by several layers of squamous epithelium. It was probably an inclusion cyst.

Fig. 6.—Cyst in the anterior vaginal wall.

Gyn. Path. No. 640. Situated beneath the urethra is a translucent cyst. On being dissected out this was found to measure 4.5 x 3.5 cm. Its inner surface was smooth and glistening and it was lined by one layer of flat cells. This cyst was in all probability a dilated portion of a Gärtner's duct.

to be carried down a little farther to have it open into or form a blind pouch in the vagina.

3. Changes in the Vagina Incident to Vaginitis. Adhesive vaginitis occasionally occurs, especially in young individuals. Here as a result of an ulcerative process or a very severe grade of inflammation associated with loss of the vaginal epithelium the vaginal folds become adherent to one another producing blind pockets. Such a vaginitis may be due to a general systemic infection, to gangrene following the presence of a foreign body in the vagina or to the highly irritative urine where inflammation of the bladder exists. These vaginal occlusions may have a definite bearing on the future development of vaginal cysts.

4. Changes in the Vagina due to Injuries at Childbirth. The different degrees of laceration of the perineum during labor are well known. Sometimes without any external laceration there may be one or more tears in the mucosa within the outlet. Again, there may be a minor or a very extensive laceration of the entire perineum. In many cases not only are the tears deep, but the injury has occurred in such a manner that little tags of mucosa lie partially detached, and during the subsequent healing of the perineum these may be turned in and included between the edges of the wound. Under these circumstances we have squamous epithelium buried in the perineum; that is, lying in the tissue from 1 to 5 mm. beneath the surface. A similar fate of the small tags of mucosa may also follow even when the perineum is immediately repaired.

5. Alterations in the Continuity of the Vaginal Mucosa Caused by Perineal Operation. Where it is deemed advisable to repair the outlet some time after labor, after having mapped out a line of denudation it is necessary to remove a large area of vaginal mucosa. But if this is cut away piecemeal instead of in long strips or where the field of operation is not kept perfectly clear, small fragments of the mucosa may be left behind.

When the edges of the wound are approximated these islands of mucosa lie more or less deeply embedded in the underlying stroma and entirely cut off from the parent mucosa.

6. The Relation of the Urethra to the Vagina. It is very important to have a clear understanding of the relation of the vagina to the urethra as they are intimately associated over a considerable distance. Furthermore, as will be seen later, certain cyst-like dilatations arising from the floor of the urethra should not be confused with vaginal cysts, although at first sight they may bear a striking similarity. Disse in v. Bardeleben's *Anatomy* has given us a very clear description of the urethra which I will quote: "The posterior wall of the urethra is firmly attached to the anterior vaginal wall throughout its entire length. Both canals run parallel to each other. The epithelium of the urethra is about 1 mm. thick. The superficial layers of cells are all composed of squamous epithelium. The cells of the deeper layers are more club-shaped. The mucosa is longitudinally folded, and as a result club-shaped and tubular depressions are produced. Some of these are simple lacunæ, others are glandular in nature and secrete a colloid material which may in time form concretions. The lacunæ are found in the entire length of the urethra. The smaller ones are broad-based and open by a narrow channel into the urethra. The larger ones are tubular, push into the propria, often branch and tend to run parallel with the surface. These are the glands that sometimes produce the hardened secretion. They are termed Littré's glands." On either side of the urethra are Skene's ducts, which must also be remembered in a consideration of vaginal cysts.

Vaginal Cysts. It is rather difficult to classify all vaginal cysts accurately according to their origin, and the accompanying figures should be accepted only as representing an approximate ratio of the different varieties to each other. I have examined in all 53 cases, and in a few of these two cysts were present in the same individual.

Variety of Cysts. In 26 the origin was clearly the result of a perineal tear or of a perineal operation; 4 seemed to originate from vaginal glands; 11 were apparently derivatives of Gärtner's duct; 3 were situated near the external orifice of the urethra. In 9 it was impossible to determine the mode of origin.

Inclusion Cysts. (Those due to small portions of the vaginal mucosa being included in the stroma.) Such cysts are relatively small and are naturally found in the posterior or in the lower lateral wall of the vagina. They are often situated in the scar tissue of an old tear or may form a globular mass projecting from the posterior vaginal wall and covered by normal vaginal mucosa (Fig. 5).

In our cases the cysts varied from 3 mm. to 2.5 cm. in diameter. The smaller ones were yellowish in color, the larger more whitish in appearance.

The cyst walls vary from 2 to 4 mm. in thickness; the inner surface is smooth. The cyst contents vary slightly. The smaller ones are often completely filled with a friable material which gives a yellowish tinge to the cyst. This at first sight slightly resembles pus, but in reality represents masses of exfoliated squamous epithelium.

On histologic examination the vaginal mucosa over the surface of the cyst is usually normal, but, as might be surmised, over the most prominent part it is often slightly atrophic. The cyst walls are composed of fibrous tissue; the inner surface is lined by a varying number of layers of squamous epithelium. Sometimes there is a uniform covering of from two to thirty layers of cells, but as a rule the epithelial lining is very thick at one part of the cyst and thin at a distant point. The superficial epithelial cells are often devoid of nuclei and are filled with vacuoles. The deepest layer is usually cuboidal.

The cysts contain desquamated squamous epithelium, detritus, and at times fat droplets and cholesterin crystals. Where the cysts are relatively large the cavity is often

partially filled with clear fluid. These cysts are usually single, but they may be multiple, as in Path. No. 3321. Here we had three small irregular cysts separated by very slender partitions. They were lined by from two to eight layers of squamous epithelium.

As has been so clearly pointed out by Stokes and others, little doubt remains that these cysts originate from inclusions of the vaginal epithelium. Our own observations fully substantiate this view. In 24 out of 26 of these cases we were able to get a satisfactory history and in every instance the patient had a lacerated perineum, and in 5 out of 24 the perineal tear extended into the rectum. In every case where the site of the cyst was noted it was found either in the posterior or lateral wall, usually in the floor of the perineum.

In Path. No. 2981 I noticed a most unusual picture in the cyst wall just beneath the lining epithelium. Here the fibrous tissue was very dense and contained numerous giant cells, some with nuclei in the center of the cell, others with the nuclei arranged peripherally, while the centers of a few contained large, faintly granular masses. The picture in no way suggested tuberculosis.

Cysts Probably Originating from Vaginal Glands. Cysts of this origin are apparently less common. Three of our cases seem to fall under this category, and possibly a fourth. In Path. No. 2131 A there was a cyst 6 mm. in diameter, situated in the scar tissue of an old perineal tear. It was lined by cuboidal or almost flat epithelium. Associated with it was a small cyst of exactly the same size and lined by several layers of squamous epithelium. The first cyst from its situation and epithelial lining was in all probability a cystic vaginal gland. In Path. No. 2133 B there was also a small cyst in the posterior vaginal sulcus lying near the scar in an old perineal tear and lined by cuboidal cells. The cyst cavity was partly filled with mucus. In this case also there was a small accompanying inclusion cyst.

Path. No. 2890 affords another example of a cystic vaginal gland. Here in the scar tissue of the vagina was a cyst 1.5 cm. in diameter lined by very low cuboidal epithelium, which secreted mucus.

In Path. No. 2930 there had been a complete tear of the perineum. There were two very small vaginal cysts lying side by side and lined by cuboidal epithelium. These were probably cystic vaginal glands, but this is only a surmise, as the exact position of the cysts was not given. In Path. Nos. 2131 A, 2133 B and 2890 I think we have a right to assume that the cysts were derived from the vaginal glands, since with the exception of the latter no other cylindric or cuboidal epithelial structures are found in this region. Of course, it might be said that the cyst was primarily lined by a squamous epithelium and that this had exfoliated leaving only the deepest layer of cuboidal cells; but had this been the case, we would still find evidence of exfoliated squamous cells in the cyst and further we would not have the deepest layer of the squamous epithelium secreting mucus. The most convincing evidence, however, is furnished by the fact that we have clear-cut types of two varieties of cysts, the inclusion cyst and that derived from vaginal glands lying side by side without any degenerative changes taking place in either of them.

Analysis of Vaginal Cysts Observed at the Johns

[If the reader wishes further particulars about the drawings in the text they will in most instances referring to this table Gyn. Path. No. 955 is readily found in the first column; the chief clinical

Gyn. path. No.	Clinical No.	Age	White or black.	Para.	Perineal tear.	Previous perineal operation	No. of cysts.	Site of cysts.	Size.	Shape.	Thickness of cyst wall.
509	3170	30	White.	2	Complete.	.....	...	....	1.5 cm.	Irregular, globular.	.....
640	3398	29	Black.	...	...	.....	1	Just beneath urethra and 2.5 cm. within vagina.	4.5x3.5 cm.	....	1-2 mm.
648	3402	36	White.	7	Yes.	0	1	Ant. vaginal wall.	1.5 cm.	Globular.	1.5 mm.
955	236 San.	...	"	...	"	0	1	.....	6 mm.	Globular.	0.5 mm.
1411	4834	36	"	8	"	Repaired in 1890.	...	.....	2.5 cm.	.....	2 mm.
1470	4928	41	"	6	"	.....	1	.....	8 mm.	.....	.....
1502	4971	...	"	...	"	.....	2	Just within right vaginal wall in sulcus.	1x1.5 cm. 0.5 cm.	.. ..	.....
1504	4973	...	"	6	"	Repaired 3 yrs. ago.	1	Posterior wall near outlet.	2.2 cm.	.....	.....
1518	4996	...	"	Yes.	Complete.	.....	1	Posterior just to right of median line.	2x1.5 cm.	Globular.	1 to 3 mm.
1562	.. ...	...	.....	...	...	....	...	.....	.....	.....	.....
1775	Specimen.	...	White.	...	Yes.	.....	1	Anterior vaginal wall	8x5 cm.	.....	3 mm.
1789	San.	...	.....	...	...	.....	1	Left vaginal wall.	1x2 cm.	.....	.....

be found in this tabulated list of the cases. For example, Fig. 1 is from Gyn. Path. No. 955; on features of the case together with the gross and histologic appearances of the cyst are also given.]

Cyst contents.	Inner surface of cyst.	Condition of overlying vaginal mucosa.	Composition of cyst wall.	Epithelial lining of cyst.	Cyst contents (microscopic).	Remarks.
Creamy yellow	.....	Slight thickening with faint downgrowths.	Connective tissue.	Squamous epithelium, 5 to 30 layers.	....	Negative on slide and culture.
Transparent.	Smooth and glistening.	Atrophied.	Connective tissue; rich blood supply; small round-cell infiltration beneath surface.	One layer of flat epithelium.		
Transparent.	Smooth and glistening.	Normal.	Fibrous tissue and non-striped muscle fibres.	One layer of cylindric epithelium.	....	Stokes' drawing.
Transparent.	Smooth	Normal, thickening at one point.	Fibrous tissue; contains gland resembling cervical gland in lining and secretion; is surrounded by inflammatory zone	One layer of cuboid epithelium.		
.....	.....	Normal on sides, total absence over prominent part; no evidence of inflammation where epithelium is missing.	Fibrous tissue; considerable muscle; small round-cell infiltrat'n beneath cyst epithelium.	Several layers of squamous epithelium.	Swollen fatty epithelial cells, many polymorphonuclear leukocytes and small round cells.	Stokes' drawing.
.....	.....	.....	.....	.....	.....	Details missing.
Clear fluid.	Very small, finger-like ingrowth.	No vaginal mucosa.	Fibrous tissue; small gland in wall, lined by one layer of cylindric epithelium.	One layer of columnar cells.	Some desquamated epithelial cells; some cells filled with yellow chromatin droplets.	Stokes' drawing.
Transparent fluid.	.....	....	Fibrous tissue; some small round-cell infiltration of wall.	Squamous epithelium; in places 10 to 12 layers; where stroma is absent cells are swollen and filled with brown pigment.		
.....	.....	Atrophy over prominent part, normal on sides.	Fibrous tissue.	Squamous epithelium; 1 to 7 layers in places, low cuboid.		
.....	.....	Normal.	Fibrous tissue.	One layer cuboid cells.		
.....	.....	Normal.	Fibrous tissue; convoluted cysts in wall lined by high cylindric epithelium; evidently due to downward projections of crypts.	One layer high cylindric; nucleus at base as in cells from cervix; in places cells cuboid; crypts present in walls.	.....	Stokes' drawing.
.....	Smooth and glistening.	Normal.	Fibrous tissue.	10 to 20 or more layers squamous epithelium.		

Gyn. path. No.	Clinical No.	Age	White or black.	Para.	Perineal tear.	Previous perineal operation	No. of cysts.	Site of cysts.	Size.	Shape.	Thickness of cyst wall.
1850	5400	29	White.	0 married.	No.	No.	1	Right side high up.	1 cm.	.....	5 mm.
2010	Specimen.	...	.....	...	...	.....	1	... .	5 mm.	.....	1 mm.
2131	5835	28	White.	1	Yes.	0	2	A, posterior r. side 2 cm. B, within vagina in scar tissue.	6 mm. 6 mm.	.....	0.5–1 mm.
2133	5846	33	"	1	"	0	2	Posterior wall close to scar in sulcus	....	.....	.....
2137	5850	29	"	1	"	0	1	Left vaginal fornix.	1 cm.	.....	1.2 mm.
2555	6287	35	"	3	"	0	1	Right vaginal fornix to right of cervix.	1x1.5 cm.	Globular.	1 mm.
2727	6504	29	"	5	"	0	...	.....	5 mm.	Round.	.....
2878	Specimen.	...	.....	...	...	.....	...	.....	1 cm.	Globular.	0.3 mm.
2890	6656	48	White.	1	Yes.	0	1	Right vaginal sulcus in scar.	1.5 cm.	.....	.....
2930	6703	21	"	1	Complete.	0	2	.....	2 mm. 1 mm.	Globular, side by side.	.....
2981	6714	36	"	4	Yes.	0	...	.....	Embed'd 2 mm. in scar tissue.	Oval.	.....
3046	6787	40	"	6	"	0	...	.....	6 mm.	Globular.	2 mm.

Cyst contents.	Inner surface of cyst.	Condition of overlying vaginal mucosa.	Composition of cyst wall.	Epithelial lining of cyst.	Cyst contents (microscopic).	Remarks.
.....	Dome-shaped elevation 2 2 mm.	Thickened but normal.	Thickened just beneath mounds; great small round-cell and polymorphonuclear infiltration with new capillaries over gland-like space lined by cylindric epithelium just beneath inner surface.	Over mounds lining of from 2 to 20 or more layers squamous epithelium; in places definite finger-like folds with gland-like depressions, one covered by a layer of perfectly cylindric epithelium; nuclei oval and near base; between epithelial cells, mono- and polymorphonuclear leukocytes.	Some polymorphonuclear leukocytes.	
.....	.....	Normal.	.....	One layer cuboid or low cylindric epithelium; small finger-like ingrowths covered by cylindric epithelium.	Desquamated epithelium.	
.....	.....	Normal.	Fibrous tissue.	A, 1 layer cuboid or almost flat. B, 2 to 20 layers squamous epithelium.		
.....	.....	Normal over both.	Fibrous tissue.	A, lined by several layers of squamous epithelium. B, apparently lined by cuboid epithelium.	Desquamated epithelium. Mucus.	
.....	.....	Thinned out over prominent part.	Fibrous tissue.	One layer cuboid epithelium.		
Clear fluid.	Smooth	Normal.	....	One layer cylindric in places cuboid epithelium.		
.....	.....	.....	Fibrous tissue.	Many layers squamous epithelium.	Partly filled with squamous epithelium.	
.....	.....	Normal but atrophic.	Fibrous tissue along one side gathered into little folds.	One layer cylindric epithelium.		
.....	Smooth	Normal.	.....	One layer very low, cuboid epithelium almost flat.	Mucus taking hematoxylin stain.	
.....	Smooth	Normal.	Just beneath cyst epithelium non-striped muscle fibres.	Each cyst lined by one layer cuboid epithelium.		
.....	.....	.....	Just beneath epithelium of cyst dense area containing giant cells, some with nuclei in center, others in periphery; centres of some contain a faintly granular mass.	3 to 8 layers flattened squamous epithelium.	Desquam. and necrotic epithelium and irregular masses of granular material similar to that found in the giant cells.	
.....	.....	Normal.	Fibrous tissue.	1 to 15 layers of squamous epithelium.		

Gyn. path. No.	Clinical No.	Age	White or black.	Para.	Perineal tear.	Previous perineal operation	No. of cysts.	Site of cysts.	Size.	Shape.	Thickness of cyst wall.
3089	6841	33	White.	1	Yes.	0	...	In right lateral wall.	1.4x1.1cm	Globular.	1 mm.
3107	6855	34	"	3	...	.....	1	Left lateral wall just within hymen.	3x1.4 cm.	Oval.	.....
3151	6887	38	"	4	Yes.	0	1	Posterior vaginal wall.	3x2 cm.	.....	.....
3321	7038	21	"	1	"	0	1	Left wall.	Cystic mass (of 5 cysts) 9 mm.	.....	0.2 mm.
3690	7453	32	"	2	"	0	...	Embedded in scar tissue.	1.5 mm.	.....	.....
3800	7547	34	"	1	"	0	1	Post. wall near outlet embedded in fibrous tissue.	5 mm.	.....	.....
4060	7804	35	"	4	"	0	1	Left lateral wall in scar.	3 mm.	Slightly irregular in outline	.....
4079	7835	26	"	3	"	0	2	.....	A, 4 mm. B, 3 mm.	.....	.....
4112	7854	37	"	10	...	.....	...	.....	2 mm.	Round.	.....
4644	8457	19	"	0	...	.....	1	Anterior vaginal wall just within hymen.	3x3x4 cm.	.....	1 mm.
4684	San.	...	"	Yes.	Yes.	0	...	.....	3 mm.	.....	.....
4836	8641	33	"	2	Complete.	0	...	.....	5x2 mm.	.....	2 mm.
5035	8844	33	"	3	...	.....	1	Ant. vaginal wall under urethra.	2.5x1.5cm	Ovoid.	0.2 mm.

Cyst contents	Inner surface of cyst.	Condition of overlying vaginal mucosa.	Composition of cyst wall.	Epithelial lining of cyst.	Cyst contents (microscopic).	Remarks.
.....	Smooth	Gathered up into folds; deep layer pigmented.	Fibrous tissue.	1 layer cuboid or flat epithelium.		
.....	Smooth	Normal.	Just beneath cyst lining two small glands lined by cylindric epithelium.	1 layer cuboid cells, apparently 2 or 3 layers in a few places.	Granular material taking hematoxylin stain.	Pearly white, covered on one side by squamous epithel.
.....	.....	Normal but atrophied over prominent part.	Fibrous tissue.	3 to 20 layers of squamous cells.		
.....	Somewhat irregular.	Normal.	Slight projections of fibrous tissue into cyst cavities; walls between cysts exceedingly delicate.	2 to 8 layers of squamous epithelium.		
.....	.....	Depression from vagina 4 mm. into depth lined by partly macerated squamous epithelium only separated from cyst by 6 rows of connective tissue cells.	Fibrous tissue.	1 to 7 layers fairly well-defined squamous epithelium.	.....	Definite inclusive cyst.
.....	.....	.....	.....	1 to 20 layers squamous epithelium.	.....	Desquam epithelium, fine granular material.
.....	.....	.....	Dense fibrous tissue.	Apparently one layer of squamous cells.		
A, yellow. B, clear fluid.	.....	Thinned out; groups of small round cells beneath surface epithelium.	Fibrous tissue; partition between cysts very delicate.	A, 1 to 4 layers of squamous cells. B, 1 layer cuboid cells.	A, desquamat'd epithelium + débris.	Interesting to find different kinds of cysts side by side.
.....	.....	.....	.....	2 to 20 or more layers squam. epith cells stain more deeply than usual; a few polymorphonucl'r leukocytes betw'n epithelial cells.	.....	Double vaginal septum removed.
Clear fluid.	.....	Normal.	Fib. tissue; definite inner zone of non-striped muscle running parallel to cyst; beneath inner epithel'm a definite stroma in places: cells are round or oval, have deeply staining nuclei, resemble stroma of uterine mucosa.	1 layer of cuboid or low cylindric epithelium clinging to inner surface.	A few mono- and polymorphonuclear leukocytes.	
.....	.....	.....	Fibrous tissue.	2 to 7 layers of squamous cells.		
.....	.....	Normal.	Fibrous tissue.	10 to 30 layers of squamous epithelium; superficial layers disintegrated.	Desquamated epithelium, débris, and large droplets, apparently fat.	
.....	Smooth	Atrophic over prominence on sides thrown into long tongue-shaped folds.	Fibrous tissue, here and there infiltrated by clusters of small round cells.	1 layer of cuboid or almost flat cells.		

Gyn. path. No.	Clinical No.	Age	White or black.	Para.	Perineal tear.	Previous perineal operation	No. of cysts.	Site of cysts.	Size.	Shape.	Thickness of cyst wall.
5037	8846	50	White.	3	Yes.	0	...	.....	7x8 mm.	.....	.....
5043	8851	38	"	3	"	.....	..	.....	3 mm.	Round.	2 mm.
5058	1194 San.	...	"	Yes.	"	....	1	Posterior vaginal wall.	5 mm.	Round.	2 mm.
5191	9028	31	"	1	"	.....	1	Posterior vaginal wall.	4 mm.	.....	.....
5450	San.	...	"	Yes.	"	.....	...	Posterior wall.	.....	.....	.....
5509	9314	25	"	1	"	.....	1	In left posterior wall embedded in deep scar.	8 mm.	.....	.....
5593	San.	...	"	Yes.	Complete.	.....	2	.....	1 mm. 1.5 mm.	Round.	.....
5792	9596	26	"	1	Complete.	.....	...	.....	5 mm.	.....	1 mm.
5793	9595	28	"	2	Complete.	.....	...	.....	3 mm.	Round.	.....
5819	9621	32	"	6	Complete.	.....	...	.....	1.5 mm.	Round.	3 mm.
6274	Specimen.	...	.....	...	...	.....	...	.....	1 cm.	.....	1 mm.
6290	San.	...	White.	Yes.	Complete.	.....	...	Lateral wall.	1 cm.	.....	2 mm.
6536	San.	...	"	Yes.	Yes.	.....	...	.....	1 cm.	Round.	2 mm.
2380	6118	35	"	2	"	.....	1	Ant. vaginal wall under urethra.	3.5x2 5x2 cm.	.....	.....
2442	Specimen.	...	.....	...	...	.....	...	.....	.....	.....	.....
2872	Specimen.	...	.....	...	...	.....	1	.....	1x0.5 cm.	Oval.	.....

Cyst contents.	Inner surface of cyst.	Condition of overlying vaginal mucosa.	Composition of cyst wall.	Epithelial lining of cyst.	Cyst contents (microscopic).	Remarks.
.....	.....	Normal.	Fibrous tissue.	1 layer of almost flat cells, cuboid type.		
.....	.....	Normal.	Fibrous tissue within blood vessels.	2 to 7 layers of squamous epithelium.		
.....	Smooth	Normal.	Fibrous tissue.	3 to 8 layers of squamous epithelium.		
.....	.....	.....	.....	4 to 6 layers of squamous epithelium.	Filled with desquamated epithelium.	
.....	.....	Normal.	Fibrous tissue.	2 to 4 layers ill-defined squamous epithelium.	Granular detritus.	
.....	.....	Atrophic but normal.	Fibrous tissue.	2 to 10 layers of squamous epithelium.		
.....	.....	Normal.	Fibrous tissue; small circular clumps of epithelium; near center two definite glands lined by cylindric epithelium.	Many layers squamous epithelium; polymorphonuclear leukocytes between epithelial cells.	Filled with desquamated epithelium and polymorphonuclear leukocytes.	Definite inclusion cyst, also well-defined vaginal glands.
Clear fluid.	.....	.....	Fibrous tissue.	Apparently cuboid or almost flat epithelium.		
Yellow and opaque.	.....	.....	Fibrous tissue.	3 to 10 layers of squamous epithelium; superficial layers degenerat'd —contain large vacuoles.		
Yellow and opaque.	.....	Normal.	Fibrous tissue.	2 to 8 layers of squamous epithelium; superficial layers almost colorless; vacuolated.		
.....	.....	.....	.....	Single layer columnar cells.		
.....	Smooth	Normal.	Fibrous tissue; contains irregular gland-like spaces lined by very high cylindric epithelium secreting mucus; most of glands open into 1 cavity.	1 layer of high cylindric epithelium and a few gland-like spaces at irregular intervals just beneath cyst cavity.	....	May have developed from urethral glands or Skene's ducts.
.....	.....	Normal.	Fibrous tissue.	1 to 15 layers degenerated squamous epithelium.	Partially filled with desquamated epith. and crystals.	
Clear yellow.	.....	Normal.	.....	1 layer columnar or cuboid cells.		
.....	.....	Normal.	.....	1 layer columnar epithelium; oval nuclei near bottom of cell; protoplasm takes hematoxylin stain.		
.....	.....	Normal.	Fibrous tissue.	Remark'ble picture 3–8 or 9 layers, the superfic. layer high cylindric resting on flattened deeply staining cells; the cylindric cells bear resemblance to cervical epithelium.		

Cysts of Gärtner's Duct. As has already been pointed out, in the fetus Gärtner's duct may in some instances pass from the parovarium down the side of or in the substance of the uterus to the cervix, and thence obliquely downward and inward to the hymen (Fig. 2). In the vagina its course may run just to the side of the urethra or in the lateral wall of the vagina. We also know that while in the majority of cases this duct disappears, in a few instances isolated portions persist in adult life. Such isolated links of the persisting duct may as a result of accumulated secretions become cystic. Numerous such examples are on record. If only one segment of the duct persist, a single cyst develops, but should five or six be present, we may have a corresponding number of cysts, which, as we should naturally suppose, occur in a single row.

The cysts may be exceedingly small, but as a rule reach several centimeters in diameter. In rare instances they almost completely block the vagina. They naturally have an outer covering of vaginal mucosa which over the most prominent part may be atrophic. The cyst walls are usually not more than 1 or 2 mm. in thickness. The inner surface of the cyst may be perfectly circular, but is frequently oblong, and now and then a cyst is met with in which there is a small stem, as it were, leading off from the main cyst. Such a finding would demonstrate fairly conclusively that a portion of the duct has not yielded so readily to the process of dilatation.

The inner surface of the cyst may be perfectly smooth along its convex vaginal surface, and yet present a definite undulating surface on the opposite or fixed side, showing clearly an unequal dilatation and differing thus from an ordinary cyst.

Occasionally we meet with an oblong cyst, as in Path. No. 1775, where the tumor measured 8 x 5 cm. The inner surface presented a definite wavy appearance, being gathered up into large and small folds.

The cysts are invariably translucent and contain a clear straw-colored or pale fluid. In all of our cases a dilatation of a portion of Gärtner's duct appears to have been responsible for the cyst. In ten of these the position of the cyst was ascertained. In the remaining one the anatomic peculiarities afforded a sufficient clue for the diagnosis. The most common situation was in the anterior vaginal wall just behind the urethral orifice.

As regards our 10 cases the distribution was as follows:

In the anterior vaginal wall near the urethra, 6 cases.
In the right lateral vaginal wall, 1 case.
In the left vaginal wall, 1 case.
In the right vaginal fornix, 1 case.
In the left vaginal fornix, 1 case.

Where the cyst is situated in the vaginal fornix the walls are liable to be considerably thicker as the duct lies more deeply embedded in the tissue.

The cyst walls proper are composed of fibrous tissue; sometimes intermingled with these are bundles of non-striped muscle fiber. They were demonstrated in two of our cases. Where the cyst is small it is often possible to make them out, but in those of large size the muscle is so spread out that sections from various portions of the wall often fail to reveal it although at other points it may be present. The inner surface of the cyst is lined by one layer of cylindric cuboidal or almost flat epithelium.

In the majority of our cases the epithelial lining consisted of cuboidal cells, in 3 cases of cylindric and in 1 of flat cells.

A Very Unusual Cyst Occurring High Up in the Vaginal Fornix. Path. No. 1850 must, I think, be included under those probably arising from Gärtner's duct on account of its location—the right vaginal fornix. It, however, presents a most unusual histologic picture.

The cyst was 1 cm. in diameter with walls 5 mm. thick. Projecting from its inner surface were dome-shaped elevations fully 2 mm. in length.

The vaginal mucosa over the cyst is atrophic but normal. The walls are composed of fibrous tissue. The dome-like elevations are newly formed, consisting of small round cells and many young capillaries. This tissue is permeated by polymorphonuclear leukocytes. Just beneath the inner surface is a well-defined gland-like space lined by cylindric epithelium.

The lining of the cyst varies much in different places. Over the dome-shaped elevations are from two to twenty layers of squamous epithelium. At other points are definite finger-like folds with gland-like depressions between them. The folds and the clefts between them are lined by one layer of cylindric or cuboidal epithelium and have oval nuclei situated near the base of the cell. A slight inflammatory change is evident, as polymorphonuclear leukocytes and small round cells are seen between the epithelial cells.

While this case is in all probability rightly classed with those having their origin from Gärtner's duct, the histologic picture is certainly difficult of explanation. This cyst gives no evidence whatever of malignancy. Such gland-like spaces may, however, account for the occasional primary adenocarcinomata that develop in the vagina. In rare instances, as pointed out by Veit and mentioned elsewhere, Gärtner's duct is patent all the way from the parovarium to the vagina. Cystic dilatation of the entire duct occasionally occurs, and as a result we then have a vaginal cyst filled with clear fluid and extending up along the side of the uterus to the parovarium. This might very well be termed a vaginoparovarian cyst. When of moderate size it will occupy one side of the vagina, but when very large, it will occupy not only the lateral wall but also encroach on the anterior and posterior surfaces of the vagina. The cyst contents are usually clear and watery, but if there has been hemorrhage into the cavity, they are chocolate-colored. At times these cysts are only partially filled with fluid. Accordingly, if pressure be exerted on the vaginal portion it collapses, the parovarian segment

meantime becoming tense. On the other hand, if pressure be made over the parovarium, the tumor mass in this situation disappears and the vaginal portion becomes distended. In none of our cases did we find evidence of a patent Gärtner's duct.

Vaginal Cysts Possibly Arising from Urethral Glands. If vaginal cysts ever owe their origin to urethral glands, such a condition is of very rare occurrence. The possibility, however, cannot be excluded; in fact, in two of our cases various histologic appearances would justify the supposition that the tissue is very similar to, if not identical with, that of the urethra. In Path. No. 2870 we have a cyst 1 x 0.5 cm., oval in form. The overlying vaginal mucosa is normal. The cyst walls are composed of fibrous tissue. The epithelial lining of the cyst presents a most unusual picture. It consists of from three to eight layers. The superficial layer is cylindric and rests on the underlying layers of flattened and deeply staining cells. The general arrangement of the epithelium simulates that found in the urethra.

In Path. No. 1502 we have a cyst 1 x 1.5 cm., in the anterior vaginal wall just within the hymen and to the right of the urethra. It is filled with clear fluid and has a delicate finger-like ingrowth. The cyst lining is composed of one layer of cylindric ciliated epithelium.

In the cyst wall is a definite gland space lined by high cylindric ciliated epithelium. It is just possible that in this case the cyst owes its origin to urethral elements. An origin from Gärtner's duct can, however, equally well be claimed.

Although in both of these cases the features in the main would suggest their origin from urethral structures, the connecting link, namely, the direct continuity with the urethra, is wanting.

Unclassified Vaginal Cysts. In nine of our cases, owing to lack of clinical details, it was impossible to venture a classification with any degree of certainty. In Path. Nos. 1470,

4060, 5792, 6274, and 2442 little is known of the clinical history. Path. No. 955 looked very much like a cystic dilatation of a Gärtner's duct. The cavity was lined by one layer of cuboidal epithelium.

In Path. No. 2010 the small cyst had a finger-like ingrowth and was lined by one layer of cylindric epithelium. It probably also represented a dilated segment of the duct. Path. No. 5037 appeared to have a similar origin.

In Path. No. 4079 B the small cyst was lined by one layer of cuboidal epithelium and lay in close contact with an inclusion cyst. In all probability it was a dilated vaginal gland.

Gas Cysts in the Vagina. Various names, such as colpohyperplasia cystica and colpitis emphysematosa, have been applied to this affection, which has been accurately described by v. Winckel. This condition is usually associated with pregnancy and consists of small cystic dilatations occurring usually in the submucosa, but occasionally in the epithelium itself. On puncturing the cyst there is a report with the escape of gas and the cyst collapses. Such cysts only last for a short time and then disappear.

von Winckel in 1886 reported three observations in pregnant women. In a space that could be covered by a dollar he found fifteen to twenty cysts. All were superficial and transparent. The mucosa in which these were embedded was hyperemic and succulent and the cysts were filled with gas. On puncture there was a loud noise with an escape of gas. C. Braun in 1861 recorded similar instances. According to Eisenlohr the cause of this disease must be a gas-producing micro-organism which stretches the lymph vessels and forces the lymph and organisms into the surrounding tissue. According to Strauss, as quoted by Veit, the cysts were usually surrounded by connective tissue, rarely by epithelium. Their occurrence seems to be analogous to that of gas cysts in the liver and other organs, and we should not be surprised if in the near future Welch's B. aerogenes capsulatus should

be proved to be the causative factor. No treatment is necessary, as the cysts are of short duration.

Echinococcus Cysts. In countries in which the echinococcus is prevalent, cysts may develop in the tissue between the rectum and vagina. They may project into the vagina and resemble vaginal cysts. If a doubt as to their nature exists, a careful microscopic examination of the cyst contents or of its wall will render the diagnosis clear.

Clinical History of Vaginal Cysts. All of the cysts in our cases were relatively small, and naturally gave rise to no symptoms whatever. In fact, they were detected during examinations for some other trouble or, as in case of inclusion cysts, during operations for perineal tears. Undoubtedly many of the smaller cysts are overlooked as in the ordinary routine laboratory examination we have found some of which no account had appeared in the clinical report. Cysts 6 to 8 cm. in diameter partially block up the vagina and may interfere with coitus. If situated in the posterior wall they may roll the pelvic floor out in such a manner that at first sight prolapsus of the vagina may be diagnosed.

Cysts of the posterior wall have, in a few instances, formed effectual barriers to delivery. In Peters' case, for example, the cyst contained about one pound of clear fluid, and had to be evacuated with the trocar before labor could proceed normally.

In the case of a vaginoparovarian cyst which is not full mere pressure is sufficient to remove the obstruction, the fluid passing up to the parovarium and the vaginal portion collapsing like a flaccid pouch.

Vaginal cysts in the posterior wall may have to be differentiated from an abscess in the rectovaginal septum. The cysts are not tender. Abscesses are painful, of rapid development and are accompanied by fever. In the lateral wall a vaginal cyst may be mistaken for a blind vagina. The thick walls of the occluded and imperfectly developed vagina and

the fact that the uterus is imperfectly developed will usually suffice to render the diagnosis clear.

A suburethral abscess may bear a striking resemblance to a vaginal cyst. In this case, however, pressure on the abscess will be followed by an escape of pus from the urethra and by collapse of the sac.

Treatment. The smaller cysts are excised and the resultant cavity is sutured. Where it is somewhat large and removal is difficult, half or three-quarters of the cyst, according to circumstances, may be cut off, and the edge of the vagina united with that of the cyst on all sides. The remaining portion of the cyst thus becomes a part of the vagina and gradually unfolds until it is scarcely recognized. Where the cyst is of the vaginoparovarian type drainage or a combined abdominal and vaginal removal may be necessary. It is, however, seldom wise to resort to an abdominal operation, unless there are pressure symptoms or the cyst is very annoying. A small dilated blind ureter must always be borne in mind when removal of cysts in the lateral or anterior wall is contemplated.

Bibliography.

Breisky. Cysten der Scheide. Pittra and Billroth, Bd. iv. Abth. i. B. Stuttgart, 1879, S. 131.

Winckel. Die Scheidencysten. Lehrbuch der Frauenkrankheiten. Leipzig, 1886, S. 153.

Freund. Beiträge zur Pathologie des doppelten Genitalkanals. Zeitschr. f. Geb. u. Gyn., 1877, Bd. i. S. 231.

Veit. Handbuch der Gynäkologie, 1897, Bd. i.

Stokes, James Ernest. The Etiology and Structure of True Vaginal Cysts. Johns Hopkins Hospital Reports, vol. vii. p. 109.

Gebhard, C. Cysten der Vagina. Pathologische Anatomie der Weiblichen Sexualorgane. Leipzig, 1899, S. 535.

Bandler, S. W. Gynecological Pathology. Abel and Bandler, 1901, p. 206.

v. Preuschen. Ueber Cysten-bildung in der Vagina. Virchow's Archiv, 1877, Bd. 70, S. 111.

Bland Sutton. Tumors, Innocent and Malignant. W. T. Keener & Co., Chicago, 1903.

Kleinwächter, L. Ein Beiträg zu den Vaginalcysten. Ztschr. f. Geb. u. Gyn., 1889, Bd. xvi. S. 36.

Brödel. Personal Communication.

Disse, J. Harnorgane. Handbuch der Anatomie des Menschen von Karl von Bardeleben, 1902, S. 145.

Kelly, Howard A. Operative Gynecology.

Peters, E. H. Eine Cystengeschwulst der hinteren Vaginalwand als Geburtshinderniss. Monatschr. f. Geburtskunde, 1869, Bd. xxxiv.

Freund. Echinococci. Gynakologische Klinik. Strassburg, Bd. i. p. 321.

Cullen, Thomas S. Suburethral Abscess. Johns Hopkins Hospital Bulletin, 1894.

Geo. L. Engelmann

IN MEMORIAM.

GEORGE J. ENGELMANN, A.M., M.D.

Died November 16, 1903.

By Joseph Taber Johnson, M.D.,
Washington, D. C.

Dr. George Julius Engelmann is dead.

He was the youngest of the founders of our Society. It is with unusual sadness that we record his sudden, untimely, and deplorable taking off.

In his death the American Gynecological Society loses one of its brightest lights, and each of its fellows a genial friend. There was a charm and a warmth about Engelmann's friendship which those of us who knew him from the beginning can never forget. He loved the Society and we all loved him. He was rarely, if ever, absent from its meetings, and his voice was frequently heard urging a high standard in our business and scientific discussions. He was particularly solicitous during the last decade that our Society should be largely represented in the International Congress of Gynecology and Obstetrics, where he took great pride in the participation of its Fellows. His acquaintance among European gynecologists and obstetricians was unusually large, and he frequently included a trip abroad in his summer vacation.

I take pleasure in quoting from Professor La Lovre, who published a sketch of Engelmann's life in *La Clinica Obstetrica* shortly after the last Congress of Obstetrics and Gynecology at Rome, in which he says, in part:

"Engelmann is a most sympathetic man; he cannot be described as of a common type, an ordinary individual, but he is of a special type of cosmopolitan. That is to say, in his veins runs the plasma of three great nations—France, Germany, and America—and the scientific education completed in these three countries has only accentuated more and more this admixture of characters; thus in seeing him you could not say to what country he belonged. It is a sympathetic type and that of a striking personality. He likes to preserve his individuality, and he does so about everything and with everyone, displaying a marked originality.

"He has an intense feeling for friendship, so much that he makes idols of his friends. He seems to me to be a good talker, which corresponds perfectly with his vast attainments, not only in his specialty, nor even in medicine alone, but in every form of knowledge."

George Julius Engelmann, A.M., M.D., Master in Obstetrics, Vienna, was born in St. Louis, Missouri, July 2, 1847; only son of George Engelmann, who was born in Frankfort-on-the-Main in 1809, and died in St. Louis in 1884. His mother was Dorothea Horstmann, born at Bacharach-on-the-Rhine in 1804, and died in St. Louis in 1879.

His early education was guided by his mother until 1856, when he was taken by his parents to Europe, receiving instruction in the great centers which his father sought in the interest of botanic research. He returned to St. Louis in 1858, and entered Washington University, where he was graduated with the valedictory in 1867.

His medical training he received abroad at the University of Berlin 1867–69, at Tübingen under von Niemeyer and von Bruns, 1869–70. He was a volunteer surgeon under the Red Cross in the Franco-Prussian War, in 1870 and 1871. Resuming his studies in Berlin under von Langenbeck, Virchow, Traube, Frerichs, and Martin, he was graduated in the spring of 1871, receiving the first medical diploma under the new German Empire.

The years 1871–72 were spent in Vienna, mainly in the gynecologic wards of Spaeth and Braun, and in the pathologic laboratory of Rokitanski. He there received the degree of Master in Obstetrics, and engaged in his first important inves-

tigation on the "Mucous Membrane of the Uterus" with Dr. Kundrat, later professor of pathologic anatomy. After a winter in the hospitals of Paris and London, Dr. Engelmann returned to St. Louis in the spring of 1873, entering at once upon the practice of medicine in his native city, taking the position of Lecturer on Pathologic Anatomy in the St. Louis Medical College. He entered with zest upon his work, took an active part in the medical life of the city, and organized the St. Louis School for Midwives and the Maternity Hospital in 1874.

After recovery from a nearly fatal sepsis, acquired in December, 1878, he gave up a laborious general practice and devoted himself entirely to diseases of women, in which he had been always most interested.

Among many of his papers may be mentioned "The Difficulties and Dangers of Battey's Operation" (*Transactions of the American Medical Association*, Philadelphia, 1878); "Battey's Operation; Three Fatal Cases, with Some Remarks upon the Indications for the Operation" (*American Journal of Obstetrics*, New York, July, 1878); "Battey's Operation; A Brief Summary of Results Achieved in the Forty-seven Cases as far as Reported" (*St. Louis Medical and Surgical Journal*, August, 1878); "Renal Disease Following Utero-ovarian Lesion" (*Transactions of the American Gynecological Society*, 1889); "Posture of Women in Labor," "Labor among Primitive Peoples, Ancient and Modern, 1882," which appeared in German (Vienna, 1884) and French (Paris, 1886), as did also the "Hystero-Neurosis, Dry Treatment," and "Electricity in Gynecology;" "Vaginal Hysterectomy and Hysterectomy by Morcellement;" "History of Vaginal Hysterectomy" (*Transactions of the Southern Surgical and Gynecological Society*, 1883 84); "The Health of the American Girl, Presidential Address" (*Southern Surgical and Gynecological Society*, 1890); "The Menstrual Function as Influenced by Modern Methods of Training, Mental and Physical, Presidential Address" (*American Gynecological Society*, 1900); "The Age of First Menstruation on the North American Continent" (*Transactions of the American Gynecological Society*, 1901); "The Increasing Sterility of American Women" (*Journal of the American Medical Association*, October 5, 1901); "Decreasing Fecundity Concomitant with the

Progress of Obstetric and Gynecic Science" (*Philadelphia Medical Journal*, January 18, 1902); "The True Suspended Position in Childbirth, and the Question of Priority" (*Therapeutic Monthly*, April, 1902); "Birth- and Death-rate as Influenced by Obstetric and Gynecologic Progress" (*Boston Medical and Surgical Journal*, May 15, 1902); "The Age of First Menstruation at Pole and Equator" (*American Gynecology*, March, 1903); "The Cause of Race Decline is Not Education" (*Popular Science Monthly*, June, 1903).

Archæologic researches in the interest of St. Louis Academy of Science in the swamp-lands of Southeast Missouri added much of interest to the Society's museum and formed the basis for his own private collection, one of the most important in the West, to which exchanges with the museums of Washington, Berlin, and Vienna added greatly. On removing to Boston in 1895, the larger part of his collection of Missouri flints and pottery from the mounds, was given to the Peabody Museum of Archæology in Cambridge.

Dr. Engelmann was a member of the St. Louis and University Clubs, St. Louis; St. Botolph Club, Boston; Professor of Diseases of Women and Operative Midwifery, Missouri Medical College, and St. Louis Post-Graduate School of Medicine; President American Gynecological Society, 1900; President Southern Surgical and Gynecological Society, 1890; President St. Louis Obstetrical and Gynecological Society, 1887–89; Honorary President of the International Congress of Gynecology and Obstetrics, 1892 and 1899; Fellow London Obstetrical Society, British Gynecological Society, Boston Obstetrical Society; Member of the American Medical Association, Massachusetts Medical Society, American Association for the Advancement of Science, St. Louis Academy of Science; Honorary Member of the Harvard Medical Alumni Association, Medical Society of the State of New York, North Texas Medical Association; Corresponding Member of the Obstetrical Society of Philadelphia, Surgical Society of Bucharest, etc.

He was married in 1879 to Emily Engelmann, who died after a long illness in 1890. In 1893 he married Mrs. Loula Clark and removed to Boston, Massachusetts, in 1895.

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